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AIR FORCE T.O. 31R5-2FRC-176-1

SYSTEM OPERATOR'S MANUAL

RADIO COMMUNICATIONS SYSTEM AN/FRC-176(V)

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

3 MAY 1982

WARNING

MI 131637

WARNING

HIGH VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to contact high-voltage connections of 115 volt ac input connections when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

WARNING Do not be misled by the term "low voltage". Potentials as low as 50 volts may cause death under adverse conditions.

For Artificial Respiration, refer to FM 21-11.

READEX FICHE best copy available

TM 11-5895-[illegible]-10
TO 31R5-2FRC-[illegible] 6-1

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4. SEND FOR HELP AS SOON AS POSSIBLE

5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

TECHNICAL MANUAL
TECHNICAL ORDER

TM 11-5895-1137-10
T.O. 31R5-2FRC-176-1

DEPARTMENTS OF THE
ARMY AND AIR FORCE

Washington, DC, 3 May 1982

System Operator's Manual
RADIO COMMUNICATIONS SYSTEM
AN/FRC-176(V)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to Commander, US Army Communications - Electronic Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward direct to the prime ALC/MST.

In either case, a reply will be sent directly to you.

		Page
	HOW TO USE THIS MANUAL	ix
CHAPTER 1	INTRODUCTION	1-1
Section I	GENERAL INFORMATION.	1-1
1-1	Scope	1-1
1-2	Maintenance Forms, Records, and Reports	1-1
1-3	Hand Receipt (-HR) Manuals.	1-1
1-4	Reporting Equipment Improvement Recommendations (EIRs)	1-2
1-5	Warranty Information.	1-2
1-6	Index of Technical Publications	1-3
1-7	Destruction of Army Electronics Materiel.	1-3
Section II	EQUIPMENT DESCRIPTION.	1-4
1-8	General Description	1-4
1-9	Nomenclature Cross-Reference.	1-4
1-10	Communication Control Console OJ-512/FRC-176(V) .	1-5
1-11	Radio Set AN/URC-103(V)1.	1-10
1-12	Control Interface Group OK-449(V)/FRC-176(V) Technical Description.	1-13
CHAPTER 2	OPERATION.	2-1
Section I	CONTROLS AND INDICATORS.	2-1
2-1	Communication Control Console OJ-512/FRC-176(V) Controls and Indicators.	2-1

		Page
2-2	Radio Set AN/URC-103(V)1, Controls and Indicators	2-28
2-3	Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators	2-38
Section II	OPERATING PROCEDURES	2-43
2-4	General	2-43
2-5	Radio Set AN/URC-103(V)1 Initial Turn-On	2-43
2-6	Communication Control Console OJ-512/FRC-176(V) Initial Turn-On	2-48
2-7	Remote Control-Monitor C-11021/URC Initial Startup and Operating Procedure	2-50
2-8	Control Interface Group OK-449(V)/FRC-176(V) Initial Turn-On	2-54
2-9	System Operating Checks	2-54
2-10	System Operating Modes	2-57
2-11	Telephone/Intercom Operation	2-59
2-12	Audio Monitor Panel Operation	2-60
2-13	RF-901 Phone Patch Controls and Operation	2-61
2-14	Tape Recorder Operation	2-61
2-15	Control Interface Group, OK-449(V)/FRC-176(V), Operating Procedures	2-64
2-16	Normal Shutdown of Radio Set AN/URC-103(V)1	2-65
Section III	EMERGENCY OPERATION	2-67
2-17	Radio Set AN/URC-103(V) Operation	2-67
2-18	Emergency Shutdown	2-68
APPENDIX A	REFERENCES	A-1
A-1	Scope	A-1
A-2	Forms	A-1
A-3	Technical Manuals	A-1
APPENDIX B	COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST	B-1
Section I	INTRODUCTION	B-1
B-1	Scope	B-1
B-2	General	B-1
B-3	Explanation of Columns	B-1
Section II	COMPONENTS OF END ITEM	B-3
Section III	BASIC ISSUE ITEMS	B-13

LIST OF ILLUSTRATIONS

Figure		Page
	CHAPTER 1	
1-1	Radio Communications System AN/FRC-176(V)	1-0
1-2	Communication Control Console OJ-512/FRC-176(V)	1-8
1-3	Radio Set AN/URC-103(V)1	1-12
1-4	Control Interface Group OK-449(V)/FRC-176(V)	1-14
1-5	RF Patch Panel	1-15
1-6	Antenna Indicator/Control Panel	1-16
	CHAPTER 2	
2-1	RF-901A, Phone Patch 1A1 and 4A1, Controls and Indicators	2-1
2-2	Audio Monitor Panel, 1A2 and 4A2, Controls and Indicators	2-4
2-3	Telephone Switch/Dial Panel, 1A3 and 4A3, Controls and Indicators	2-5
2-4	Headset/Lamp Test Panel, 1A5 and 4A5, Controls and Connectors	2-6
2-5	Tape Transport Controls	2-7
2-6	Playback Controls	2-9
2-7	Record Controls	2-11
2-8	Rear Panel, Controls and Connectors	2-14
2-9	Tape Transport Unit, 1A6 and 4A6, Controls and Indicators	2-16
2-10	Audio/Keyline Switch Panel, 2A2 and 5A2, Controls and Indicators	2-17
2-11	Status Monitor Unit, 3A1 and 3A3, Controls and Indicators	2-21
2-12	Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators	2-23
2-13	Preselector F-1520/URC, Controls and Indicators	2-28
2-14	Receiver-Transmitter Radio RT-1391(P)/URC, Controls and Indicators	2-30
2-15	Processor-Interface Unit CP-1479/URC, Controls and Indicators	2-32
2-16	Radio Frequency Amplifier AM-7127/URC, Controls and Indicators	2-34
2-17	Power Supply PP-5237/UR. Operating Indicators	2-37
2-18	DC Patch Panel, 1A6 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators	2-39
2-19	Audio Patch Panels, 1A7 and 1A8 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators	2-40
2-20	RF Patch Panel, 2A1 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators	2-41
2-21	Antenna Control/Indicator, 2A1 thru 2A5 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators	2-42

LIST OF ILLUSTRATIONS (Continued)

Figure		Page
2-22	Communication Control Console Initial Turn-On Control Settings.	2-48
2-23	Control Interface Group OK-449(V)/FRC-176(V) Rear View	2-55
	APPENDIX B	
B-1	Radio Communications System AN/FRC-176(V).	B-3
B-2	Radio Set AN/URC-103(V)1	B-4
B-3	Communication Control Console OJ-512/FRC-176(V). .	B-6
B-4	Control Interface Group OK-449(V)/FRC-176(V) . . .	B-10
B-5	Radio Communications System AN/FRC-176(V) Basic Issue Items List.	B-13

LIST OF TABLES

Table		Page
	CHAPTER 1	
1-1	Site Equipment Complement.	1-2
1-2	Nomenclature Cross-Reference List.	1-4
1-3	Communication Control Console OJ-512/FRC-176(V), Components	1-9
1-4	Antenna Configurations	1-13
	CHAPTER 2	
2-1	RF-901A, Phone Patch Panel 1A1 and 4A1, Controls and Indicators	2-2
2-2	Audio Monitor Panel, 1A2 and 4A2, Controls and Indicators	2-4
2-3	Telephone Switch/Dial Panel, 1A3 and 4A3, Controls and Indicators	2-5
2-4	Headset/Lamp Test Panel, 1A5 and 4A5, Controls and Indicators	2-6
2-5	Tape Transport Controls.	2-7
2-6	Playback Controls.	2-9
2-7	Record Controls.	2-11
2-8	Rear Panel, Controls and Connectors.	2-14
2-9	Tape Transport Unit, 1A6 and 4A6, Controls and Indicators	2-16
2-10	Audio/Keyline Switch Panel, 2A2 and 5A2, Controls and Indicators	2-17
2-11	Status Monitor Unit, 3A1 and 3A3, Controls and Indicators	2-21
2-12	Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators.	2-23
2-13	Preselector, F-1520/URC, Controls and Indicators . .	2-29
2-14	Receiver-Transmitter Radio RT-1391(P)/URC, Controls and Indicators	2-30
2-15	Processor-Interface Unit CP-1479/URC, Controls and Indicators	2-33
2-16	Radio Frequency Amplifier AM-7127/URC, Controls and Indicators	2-34
2-17	Power Supply PP-5237/UR, Operating Indicators. . . .	2-37
2-18	Antenna Control/Indicator, 2A2 thru 2A5 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators	2-42
2-19	Radio Set AN/URC-103(V)1 Standard Pre-Turn-On Switch and Selector Position Setup Procedure.	2-43
2-20	Radio Set AN/URC-103(V)1 Standard Turn-On Procedure.	2-46
2-21	Control Console Turn-On Procedure.	2-49
2-22	RCU Display Code Interpretation.	2-51
2-23	Radio Set Mode Versus Fine Tune Indicator Data . . .	2-54
2-24	System Operating Checks.	2-56

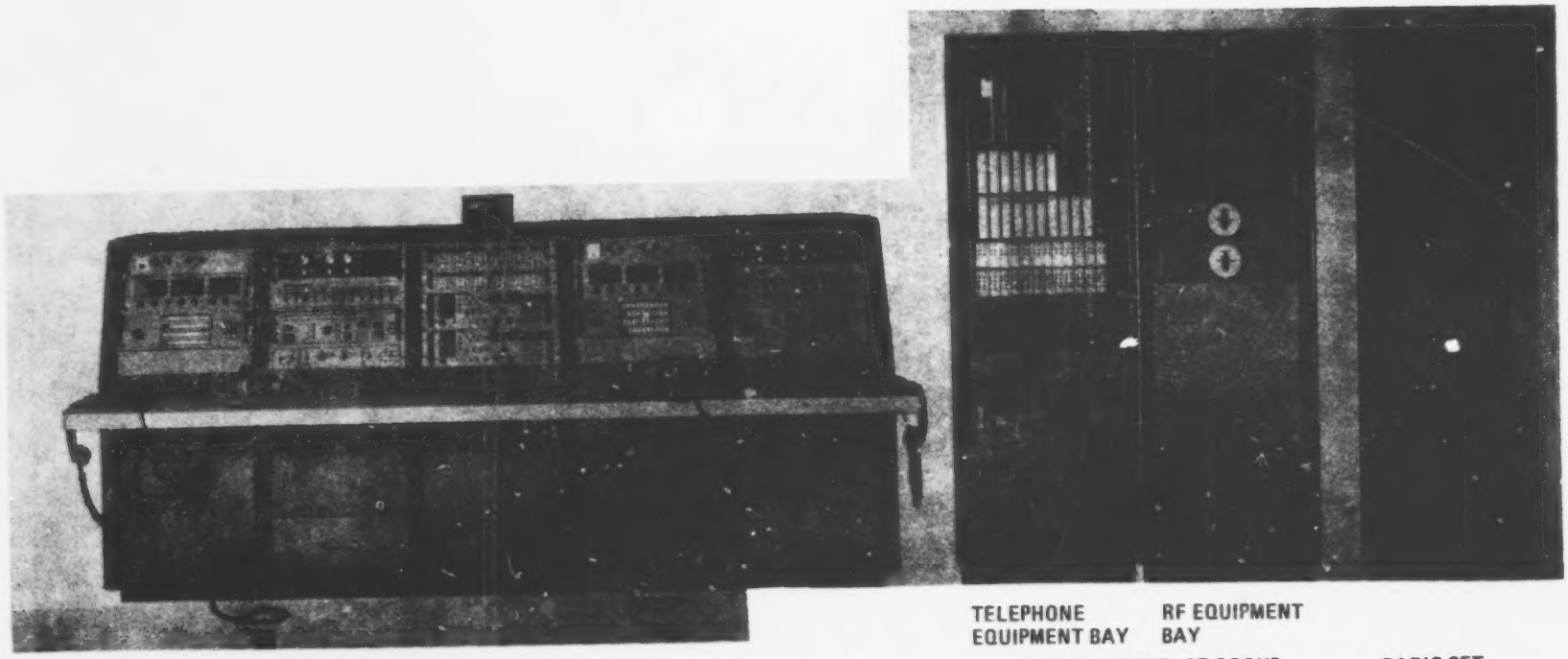
LIST OF TABLES (Continued)

Table		Page
	APPENDIX B	
B-1	Components of Radio Communications System AN/FRC-176(V)	B-3
B-2	Components of Radio Set AN/URC-103(V)1.	B-5
B-3	Components of Communication Control Console OJ-512/FRC-176(V).	B-7
B-4	Components of Control Interface Group OK-449(V)/ FRC-176(V)	B-11
B-5	Radio Communications System AN/FRC-176(V) Basic Issue Items List	B-13

HOW TO USE THIS MANUAL

This manual is organized into two chapters. Chapter 1 contains general information about the Radio Communications System AN/FRC-176(V). Chapter 2 includes specific information regarding system operating procedures, controls and indicators.

Appendix A contains system level support documentation material, and Appendix B contains the system COEIL.



COMMUNICATION CONTROL CONSOLE
OJ-512/FRC-176(V)

TELEPHONE EQUIPMENT BAY

RF EQUIPMENT BAY

CONTROL INTERFACE GROUP
OK-449(V)/FRC-176(V)

RADIO SET
AN/URC-103(V)1

ANTENNA EQUIPMENT GROUP

- HORIZONTAL LOG PERIODIC AS-3513/GRC
- BROADBAND DIPOLE AS-3514/GRC
- ROTATABLE LP AS-3515/GRC
- HORIZONTAL LOG PERIODIC AS-3524/GRC
- HORIZONTAL LOG PERIODIC AS-3530/GRC
- BROADBAND DIPOLE AS-3531/GRC
- DOUBLET DIPOLE AS-3532/GRC

Figure 1-1. Radio Communications System AN/FRC-176(V)

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

This manual contains general information and operating instructions for the AN/FRC-176(V) Radio Communications System shown in figure 1-1. Actual equipment distribution may vary as shown in table 1-1. General information is contained in chapter 1, and system level operating procedures are contained in chapter 2. Two appendixes are included at the back of the manual. Appendix A provides quick reference data for forms and related support documentation. Appendix B is the Component Of End Item List (COEIL). For detailed AN/URC-103(V)1 Radio Set data, see TM 11-5820-893-14.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance System (Army). Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting.

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73/AFR 400-54/MCO 4430.3E.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/ NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C/DLAR 4500.15.

1-3. HAND RECEIPT (-HR) MANUALS

This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). The TM 11-5895-1137-10-HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (i.e., COEI, BII, and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the US Army Adjutant General Publications Center, Baltimore, MD, in accordance with the procedures in Chapter 3, AR 310-2, and DA Pam 310-10-2.

Table 1-1. Site Equipment Complement

Equipment	Bann	Boeblingen	Edingen	Bremerhaven	Nellingen	Incirlik
Radio Set AN/URC-103(V)	22	8	6	6	6	10
Comm Control Console OJ-512/FRC-176(V)	3	1	1	1	1	1
Cont. Intfc. Gp. OK-449(V)/ FRC-176(V)	1	1	1	1	1	1
Antenna Equip						
AS-3513	0	0	1	0	0	0
AS-3514	2	0	0	0	0	0
AS-3515	4	2	2	0	2	3
AS-3529	1	0	0	0	0	0
AS-3530	0	0	0	0	0	1
AS-3531*	0	0	0	0	0	0
AS-3532	1	0	0	4	0	3

*Used at other locations in system.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

a. Army. If your AN/FRC-176(V) Radio Communications System needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703. We'll send you a reply.

b. Air Force. Air Force personnel are encouraged to submit EIR's in accordance with AFM 900-4.

1-5. WARRANTY INFORMATION

Harris RF Communications warrants the equipment purchased hereunder to be free from defect in material and workmanship under normal use and service, when used

for the purpose of which the same was designed, for a period of one year from the date of delivery, provided that notice of such defect is given to Harris RF Communications within sixty (60) days after the discovery thereof and provided that inspection by Harris RF Communications indicates the parts are defective to Harris RF Communications' reasonable satisfaction. Harris RF Communications' obligations under this warranty are limited to the repair or replacement of defective parts and the return of such repaired or replaced parts to the purchaser FOB factory. At Harris RF Communications' option, any defective part shall be returned to Harris RF Communications' factory for inspection, properly packed and all expenses prepaid. No parts shall be returned unless the purchaser first obtains a return authorization number, which will be furnished on request. Electron tubes are warranted in accordance with the manufacturer's standard tube warranty policy, which will be furnished on request. Equipment furnished by Harris RF Communications, but manufactured by another, bears only the warranty given by such other manufacturer, which will be furnished upon request. NO WARRANTIES OTHER THAN THOSE SET FORTH IN THIS SECTION ARE GIVEN OR ARE TO BE IMPLIED INCLUDING IMPLIED WARRANTY FOR MERCHANTABILITY OR FITNESS FOR THE INTENDED PURPOSE, WITH RESPECT TO THE EQUIPMENT FURNISHED HEREUNDER AND HARRIS RF COMMUNICATIONS SHALL IN NO EVENT BE LIABLE FOR CONSEQUENTIAL DAMAGES, OR FOR LOSS, DAMAGES, OR EXPENSE DIRECTLY OR INDIRECTLY ARISING FROM THE USE OF THE PRODUCTS, OR ANY INABILITY TO USE THEM EITHER SEPARATELY OR IN COMBINATION WITH OTHER EQUIPMENT.

1-6. INDEX OF TECHNICAL PUBLICATIONS

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-7. DESTRUCTION OF ARMY ELECTRONICS MATERIEL

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

Section II. EQUIPMENT DESCRIPTION

1-8. GENERAL DESCRIPTION

The AN/FRC-176(V) Radio Communications System consists of four major functional equipment groups.

- Communication Control Console OJ-512/FRC-176(V)
- Radio Set AN/URC-103(V)1
- Control Interface Group OK-449(V)/FRC-176(V)
- Dummy Load and Antenna Complement

The number of specific equipments within any functional group can vary to accommodate specific station requirements. Each of these functional groups are discussed in subsequent paragraphs.

1-9. NOMENCLATURE CROSS-REFERENCE

Many of the components of the AN/FRC-176(V) are commercially manufactured items and contain manufacturer's identification markings. Table 1-2 provides cross-reference data between the official nomenclature, the manufacturer's model number, and part number.

Table 1-2. Nomenclature Cross-Reference List

Equipment	Nomenclature	Model No.	Part Number
Radio Set	AN/URC-103(V)1	RF-270-5A	10061-3050
Receiver-Transmitter, Radio	RT-1391(P)/URC	RF-2305	10061-1150
Processor-Interface Unit	CP-1479/URC	RF-2305-01	10061-2006
Amplifier, Radio Frequency	AM-7127/URC	RF-110A	1932-1000
Power Supply	PP-5237/UR	RF-124	8913/001
Preselector	R-1520/URC	RF-551	0905-4050
Control-Monitor, Remote	C-11021/URC	RF-7401	10063-0000
Switching Unit, Radio Frequency	SA-2347/URC	RF-551/270	10061-0200

Table 1-2. Nomenclature Cross Reference List (Continued)

Equipment	Nomenclature	Model No.	Part Number
Rack, Electrical Equipment	MT-6199/URC		10061-3110
Dummy Load, Electrical	DA-712/URC		8251
Antenna	AS-3513/GRC		TCI 621-01-06
Antenna	AS-3514/GRC		TCI 613-1
Antenna	AS-3515/GRC	HyGain 5000	
Antenna	AS-3529/GRC		HLP 623.8SR
Antenna	AS-3530/GRC		HLP 623.8MR
Antenna	AS-3531/GRC		BBD 800.2
Antenna	AS-3532/GRC		DBL-3T

1-10. COMMUNICATION CONTROL CONSOLE OJ-512/FRC-176(V)

Communication Control Console OJ-512/FRC-176(V) is a two operator position, five bay console that can accommodate remote control operation of up to 12 Radio Sets AN/URC-103(V)1. The console accomplishes all of the switching required to supervise and operate the HF radio sets, audio monitors, headsets, microphones, telephones, and associated keyline and interlock circuitry. The console offers operators wide control versatility, ranging from selection of six voice control source modes, TTY mode selection, VOX or Manual keying; to continuous channel monitoring and continuous tape logging features. The major components of Communications Control Console OJ-512/FRC-176(V) are identified in figure 1-2 and table 1-3. Each of the components is described below.

a. RF-901A Phone Patch (Operator A), Item 1. The RF-901A Phone Patch provides receive/transmit (VOX) keyline control, and manual keyline control between the Radio Set and the telephone lines.

b. Audio Monitor Panel (Operator A), Item 2. The Audio Monitor Panel provides circuitry to present audio, as selected on the Audio/Keyline Switch Panel, on either the Monitor A, Monitor B, Send/Receive loudspeakers, or on the operator's headset. This panel also allows the operator to control the volume and squelch on any of the monitor channels selected.

c. Telephone Switch/Dial Panel (Operator A), Item 3. The Telephone Switch/Dial Panel serves as a telephone attendant console enabling the operator to seize one of 12 telephone lines. The line may be utilized by the operator as a regular telephone circuit for placing or receiving calls, or it may be connected to a radio channel via the Audio/Keyline Switch Panel.

d. Communication Security Equipment (Operator A), Item 4. A space is provided for future secure voice equipment.

e. Telephone Handset (Operator A), Item 5. The telephone handset is keyed by the operator in conjunction with the Telephone Switch/Dial Panel, when making connections between landlines and the radio.

f. Headset (Operator A), Item 6. The headset provides binaural monitoring of the A Monitor in the right earpiece, and the B Monitor in the left earpiece. The headset also includes a boom microphone. The headset is selectable by the MIKE SELECT switch on the Audio/Keyline Switch Panel (Item 12).

g. Headset/Lamp Test Panel (Operator A), Item 8. The Headset/Lamp Test Panel provides circuitry to interface the operator's headset with the Audio Monitor Panel and Audio/Keyline Panel. It also contains circuitry to test incandescent lamps on the Telephone Switch/Dial Panel.

h. Tape Transport (Operator A), Item not shown, behind Operator A Console. This unit contains three ac driven spooling motors, and an integrated control logic with tap motion sensor that provides for any desired transition between different operating modes.

i. Boom Microphone (Operator A), Item 10. The Boom Microphone is switch-selected by an operator at the Audio/Keyline Switch Panel. The low impedance microphone is designed to provide high quality speech communications in a noisy environment.

j. Footswitch RF-920 (Operator A), Item 9. The RF-920 Footswitch provides manual transmitter keying in conjunction with the Audio/Keyline Switch Panel.

k. Tape Control Unit (Operator A), Item 11. The Tape Control Unit contains the controls and indicators required to perform record and playback functions for either tape recorder channel.

l. Audio/Keyline Switch Panel (Operator A), Item 12. The Audio/Keyline Switch Panel is the heart of console operation. It provides controls and indicators for configuring and monitoring radio, telephone, and TTY communications modes. Through this panel, the operator can select voice control source, transceiver modes, TTY versus transceiver configuration, tape recorder modes, or audio monitor modes.

m. Status Monitor Panel (Operator A), Item 15. The Status Monitor Panel provides direct status readout for up to six individual transceivers under operator A control, and sounds an audible alarm if any of the monitored transceivers should fault.

n. Remote Control-Monitor C-11021/URC (Operator A), Item 14. Remote Control-Monitor C-11021/URC provides frequency configuration function control and readback status, under operator A control, for the transceivers. Panel mounted speaker, volume control, and squelch controls are not used.

o. RF-901A Phone Patch (Operator B), Item 17. The RF-901A Phone Patch provides receiver/transmit (VOX) keyline control, and manual keyline control between the radio set and the telephone lines.

p. Audio Monitor Panel (Operator B), Item 18. The Audio Monitor Panel provides circuitry to present audio, as selected on the Audio/Keyline Switch Panel, on either the Monitor A, Monitor B, Send/Receive loudspeakers, or on the operator's headset. This panel also allows the operator to control the volume and squelch on any of the monitor channels selected.

q. Telephone Switch/Dial Panel (Operator B), Item 19. The Telephone Switch/Dial Panel serves as a telephone attendant console enabling the operator to seize one of 12 telephone lines. The line may be utilized by the operator as a regular telephone circuit for placing or receiving calls, or it may be connected to a radio channel via the Audio/Keyline Switch Panel.

r. Communication Security Equipment (Operator B), Item 20. A space is provided for future secure voice equipment.

s. Headset/Lamp Test Panel (Operator B), Item 28. The Headset/Lamp Test Panel provides circuitry to interface the operator's headset with the Audio Monitor Panel and Audio/Keyline Panel. It also contains circuitry to test incandescent lamps on the Telephone Switch/Dial Panel.

t. Tape Transport (Operator B), Item not shown, behind Operator B Console. This unit contains three ac driven spooling motors, and an integrated control logic with tape motion sensor that provides for any desired transition between different operating modes.

u. Telephone Handset (Operator B), Item 27. The telephone handset is used by the operator in conjunction with the Telephone Switch/Dial Panel.

v. Headset (Operator B), Item 23. The headset is used by the operator in conjunction with the Audio/Keyline Switch Panel.

w. Boom Microphone (Operator B), Item 25. The Boom Microphone is switch-selected by an operator at the Audio/Keyline Switch Panel. The low impedance microphone is designed to provide high quality speech communications in a noisy environment.

x. Footswitch RF-920 (Operator B), Item 21. The RF-920 Footswitch provides manual transmitter keying in conjunction with the Audio/Keyline Switch Panel.

y. Tape Control Unit (Operator B), Item 24. The Tape Control Unit contains the controls and indicators required to perform record and playback functions for either tape recorder channel.

z. Audio/Keyline Switch Panel (Operator B), Item 26. The Audio/Keyline Switch Panel is the heart of console operation. It provides controls and indicators for configuring and monitoring radio, telephone, and TTY communications modes. Through this panel, the operator can select voice control source, transceiver modes, TTY versus transceiver configuration, tape recorder modes, or audio monitor modes.

aa. Status Monitor Panel (Operator B), Item 15. The Status Monitor Panel provides direct status readout for up to six individual transceivers, under Operator B control, and sounds an audible alarm if any of the monitored transceivers should fault.

ab. Remote Control-Monitor C-11021/URC (Operator B), Item 16. Remote Control-Monitor C-11021/URC provides frequency configuration, function control and readback status, under Operator B control, for the transceivers. Panel mounted speakers, volume control and squelch controls are not used.

ac. Digital Clock, Item 31. The Digital Clock unit provides a continuous time readout in hours, minutes, and seconds; and is common to both operators.

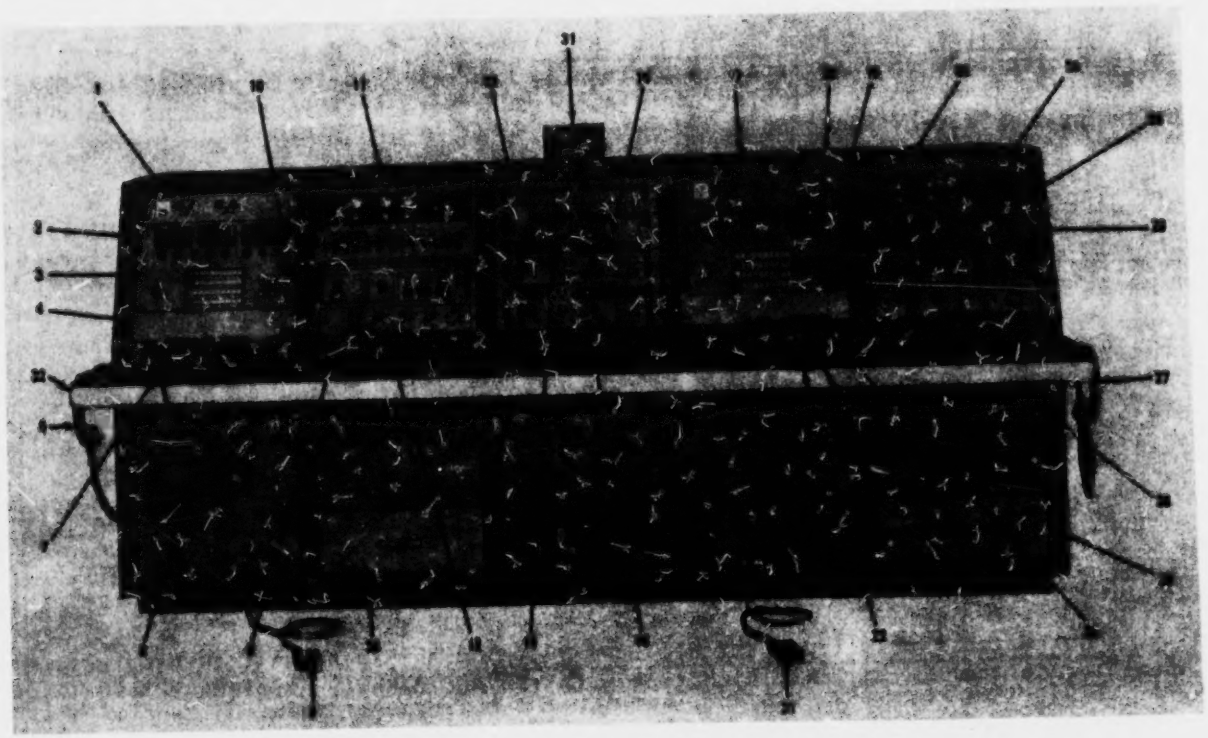


Figure 1-2. Communication Control Console OJ-512/FRC-176(V)

Table 1-3. Communication Control Console OJ-512/FRC-176(V), Components

Item Number	Reference Designator	Function	Operator
1	1A1	RF-901A Phone Patch	"A"
2	1A2	Audio Monitor Panel	"A"
3	1A3	Telephone Switch/Dial Panel	"A"
4	1A4	Blank Panel at all sites except Bann, used for Console Select Switching at Bann Site.	"A"
5	1HTA2	Telephone Handset	"A"
6	1HS	Headset	"A"
7	P/O 1HS	Headset Keyline Control (P/O Headset)	"A"
8	1A5	Telephone Switch/Dial Lamp Test Panel (Not shown)	"A"
9	1S1	Footswitch	"A"
10	1MK	Boom Microphone	"A"
11	2A1	Tape Control Assembly	"A"
12	2A2	Audio/Keyline Switch Panel	"A"
13	3A1	Status Monitor Panel	"A"
14	3A2	Remote Control-Monitor Unit	"A"
15	3A3	Status Monitor Panel	"B"
16	3A4	Remote Control-Monitor Unit	"B"
17	4A1	RF-901A Phone Patch	"B"
18	4A2	Audio Monitor Panel	"B"
19	4A3	Telephone Switch/Dial Panel	"B"
20	4A4	Blank panel at all sites except Bann, used for Console Select Switching at Bann Site.	"B"
21	4S1	Footswitch	"B"

Table 1-3. Communication Control Console OJ-512/FRC-176(V), Components (Continued)

Item Number	Reference Designator	Function	Operator
22	P/O 4HS	Headset Keyline Control (P/O Headset)	"B"
23	4HS	Headset	"B"
24	5A1	Tape Control Assembly	"B"
25	4MK	Boom Microphone	"B"
26	5A2	Audio/Keyline Switch Panel	"B"
27	5HTA2	Telephone Handset	"B"
28	4A5	Telephone Switch/Dial Lamp Test Panel (Not shown)	"B"
29	---	Storage Drawer	"B"
30	---	Storage Drawer	"A"
31	3A9	Digital Clock	---
32	---	Writing Surface	---

1-11. RADIO SET AN/URC-103(V)1

Radio Set AN/URC-103(V)1 is a 1000 watt SSB (Single Side Band) transceiver which provides transmit and receive functions in the 2 MHz to 30 MHz frequency range. Radio Set AN/URC-103(V)1 offers wide versatility, ranging from a simple-to-operate local controlled transceiver to an automated multiple-transceiver, remotely-controlled system. Radio Set AN/URC-103(V)1 shown in figure 1-3, includes the following equipment.

a. Preselector F-1520/URC. Preselector F-1520/URC is a tuned active bandpass filter which provides continuous tuning from 2.000 to 29.999 MHz in 1 kHz increments. The unit is equipped with a Remote Control Module which provides both manual and automatic frequency selection. Manual frequency selection is accomplished using the front panel controls on the unit, while automatic frequency selection is controlled by BCD (binary coded decimal) frequency data from the Processor-Interface Unit, CP-1479/URC. Normally, automatic frequency control is used for most Radio Set applications.

b. Receiver-Transmitter Radio RT-1391(P)/URC. Receiver-Transmitter, Radio RT-1391(P)/URC is the primary unit of Radio Set AN/URC-103(V)1, providing all receiver and transmitter functions. The unit specifically designed as a driver unit for Radio Frequency Amplifier AM-7127/URC used in Radio Set AN/URC-103(V)1.

Using its Program PWB Assembly, the unit can store control data for up to 32 simplex or 16 half-duplex field-programmable channels. Mode selection can be programmed to operate automatically in conjunction with the MHz/kHz Channel Selector or manually through the Mode Switch on the front panel.

c. Processor-Interface Unit CP-1479/URC. Processor-Interface Unit CP-1479/URC provides control interfaces between Receiver-Transmitter Radio RT-1391(P)/URC and other units of Radio Set AN/URC-103(V). Special Local Control Unit PWBs (an Input/Output PWB, a Central Processor Unit (CPU) PWB, and a Modem PWB) are installed, allowing Radio Set AN/URC-103(V)1 to be controlled by digital commands from the Remote Control-Monitor (located in the Communications Control Console).

d. Radio Frequency Amplifier AM-7127/URC. Radio Frequency Amplifier AM-7127/URC is a linear amplifier that is driven by low level (100 mW) output signal of the Receiver-Transmitter Radio RT-1391(P)/URC. The unit provides two stages of amplification, a driver amplifier and a final amplifier, which linearly amplify the input signal to a 1 kW level. Each amplifier stage consists of two parallel-connected electron tubes and operates into a band-switched transformer assembly containing 19 pretuned broadband transformers.

e. Power Supply PP-5237/UR. Power Supply PP-5237/UR provides the 230 Vac, 50-60 Hz, 1 Phase primary power required by individual units of Radio Set AN/URC-103(V)1 and high-level dc voltages required by the power tubes of Radio Frequency Amplifier AM-7127/URC. In addition, the power supply provides the 115 Vac, 400 Hz power required by the blower in Radio Frequency Amplifier AM-7127/URC.

Radio Set AN/URC-103(V)1 can be operated in the following basic modes:

- USB (A3J) Mode
- LSB (A3J) Mode
- Compatible AM(AME) (A3H) Mode
- CW (A1) Mode
- AFSK Mode

The major equipments are installed in the standard 19 inch (48.26 cm) Electrical Equipment Rack MT-6199/URC, and are mounted on slides to provide easy access to internal components.

Radio Set AN/URC-103(V)1 can be used with any antenna that presents a nominal 50 ohm load and is capable of handling a 1 kW power level. The antenna configuration used is dependent on the location and desired service usage of Radio Set AN/URC-103(V)1. In this system, the following options shown in table 1-4 are provided.

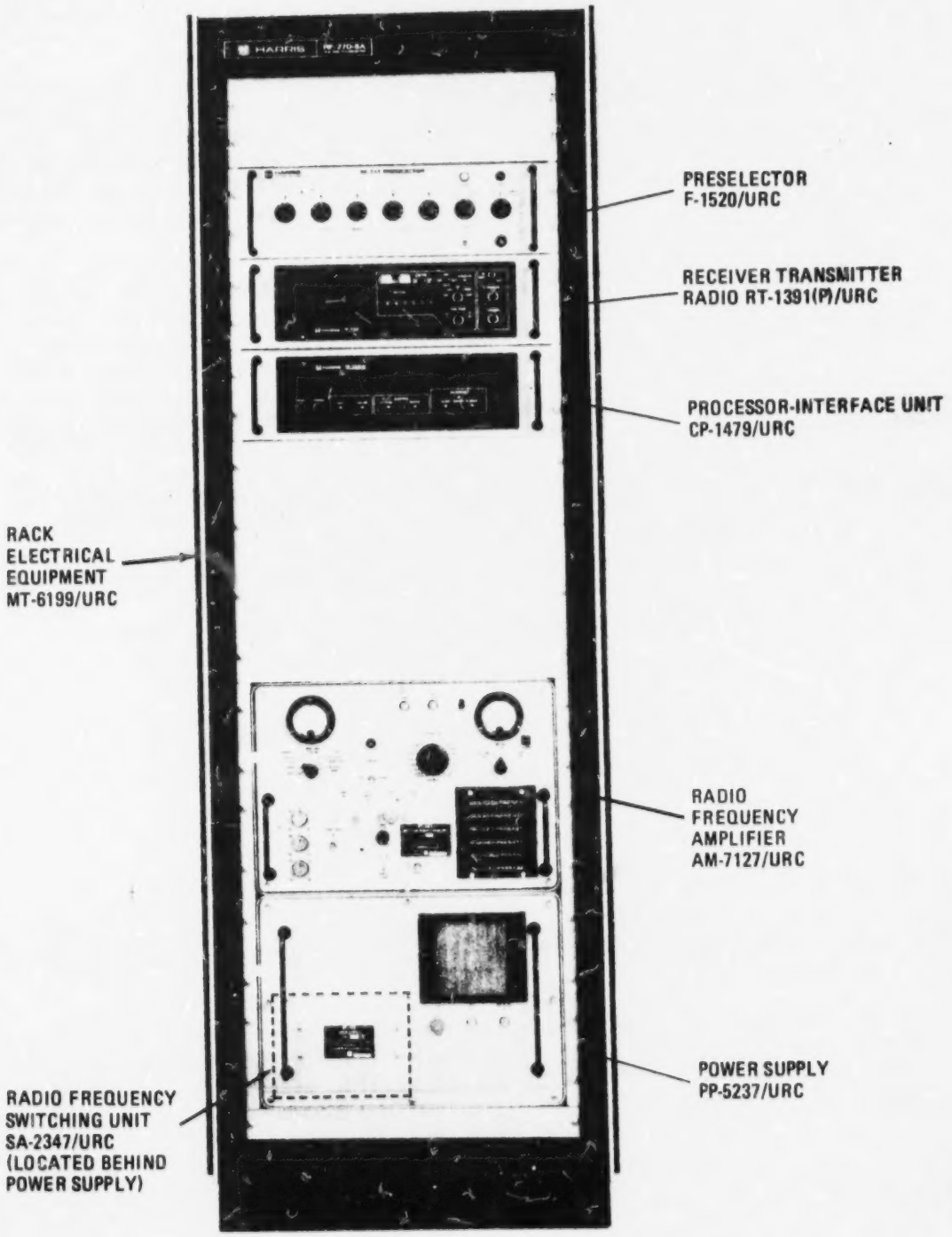


Figure 1-3. Radio Set AN/URC-103(V)1

Table 1-4. Antenna Configurations

Type	Name	Power Rating	Freq. Range	Range	Gain
AS-3513	Horizontally Polarized Log Periodic	1 kW	2-30 MHz	Short	7.5-13 dB
AS-3514	Broadband Dipole	1 kW	2-26 MHz	Short @ Low Freq Medium @ High Freq	4-6 dB
AS-3515	Rotatable Log Periodic	20 kW	3-30 MHz	Long	7.5 dB
AS-3529	Horizontally Polarized Log Periodic	1 kW	3.8-30 MHz	Short	12-13 dB
AS-3530	Horizontally Polarized Log Periodic	1 kW	3.8-30 MHz	Medium	12-13 dB
AS-3531	Broadband Dipole	1 kW	2-30 MHz	General Purpose	Unity
AS-3532	Triple Doublet Dipole	1 kW	3 Discrete Frequencies in the 2-30 MHz Range	General Purpose	Unity

Complete technical definition and maintenance procedures for the antennas are included in TM 11-5985-363-14+P.

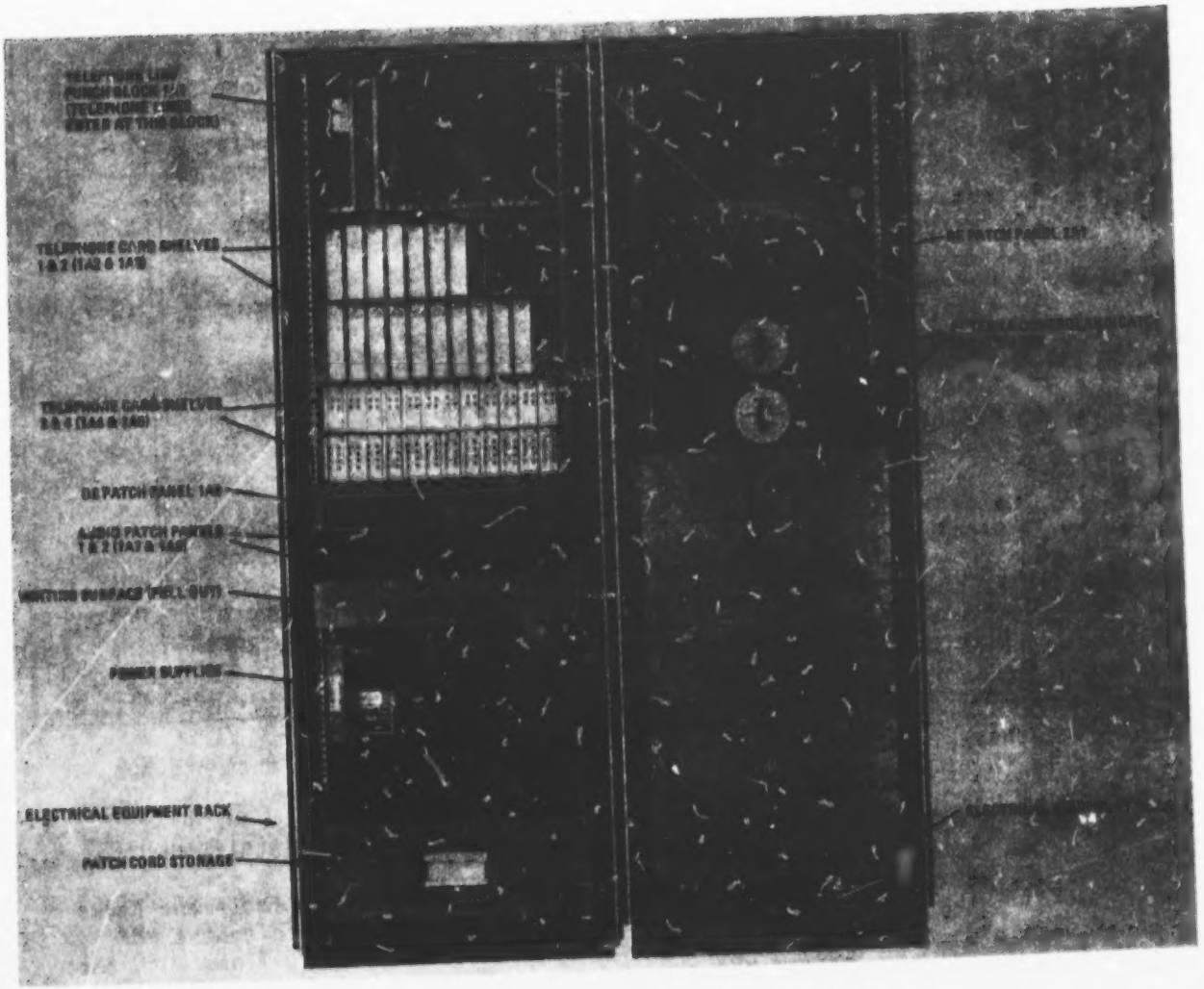
1-12. CONTROL INTERFACE GROUP OK-449(V)/FRC-176(V) TECHNICAL DESCRIPTION

The Control Interface Group OK-449(V)/FRC-176(V) consists of two Equipment Racks (figure 1-4) which house equipment that interfaces the external telephone PBX with the console's telephone equipment; and the Radio Set's audio lines with the console's Audio/Keyline Switch Panel equipment.

The Control Interface Group also contains Antenna Control/Indicator Units and antenna patch panels.

a. Telephone Equipment Bay. The following major equipment is housed in the Telephone Equipment Bay.

(1) Telephone Line Punch Blocks. All of the outside land line telephone lines are entered into the equipment through the punch blocks in the top of the cabinet.



UNIT 1 TELEPHONE EQUIPMENT BAY UNIT 2 RF PATCH EQUIPMENT BAY

Figure 1-4. Control Interface Group OK-449(V)/FRC-176(V)

(2) Telephone Card Shelves. These four shelves contain circuit conditioning cards for the telephone line circuits. These provide interface with the console equipment and the radios.

(3) Patch Panels. The dc and audio patch panels provide access to the equipment for testing and maintenance. When no patch cords are inserted, the circuits are all in normal connection configurations.

(4) Writing Shelf. This shelf can be extended to provide a writing surface or a working surface for maintenance.

(5) Power Supplies. These provide the dc power required by the telephone equipment cards. This section also provides the ac power distribution.

(6) Storage Drawer. This drawer is used to store patch cords, test cables, and other small maintenance items.

b. RF Equipment Bay. Figures 1-5 and 1-6 show equipment located in the RF Equipment Bay. RF Patch Panels vary to meet the requirements of each individual site. Patch cords are fixed at the ANTENNA connector, and are "patched" to connect the desired antenna to the desired transmitter. Interlock switches at each TRANSMITTER jack to prevent keying an unterminated transmitter. Unterminated antenna plugs can be stowed at DUMMY PLUGS. A 1000 watt dummy load is also provided with each rack for testing or general purpose.

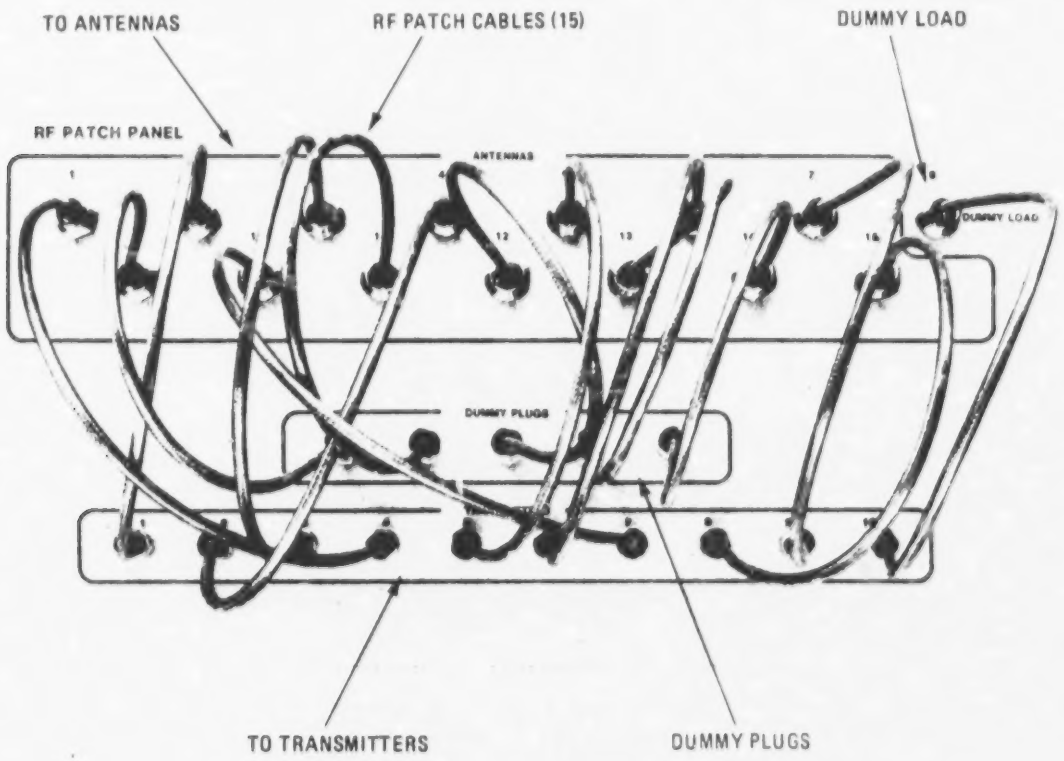
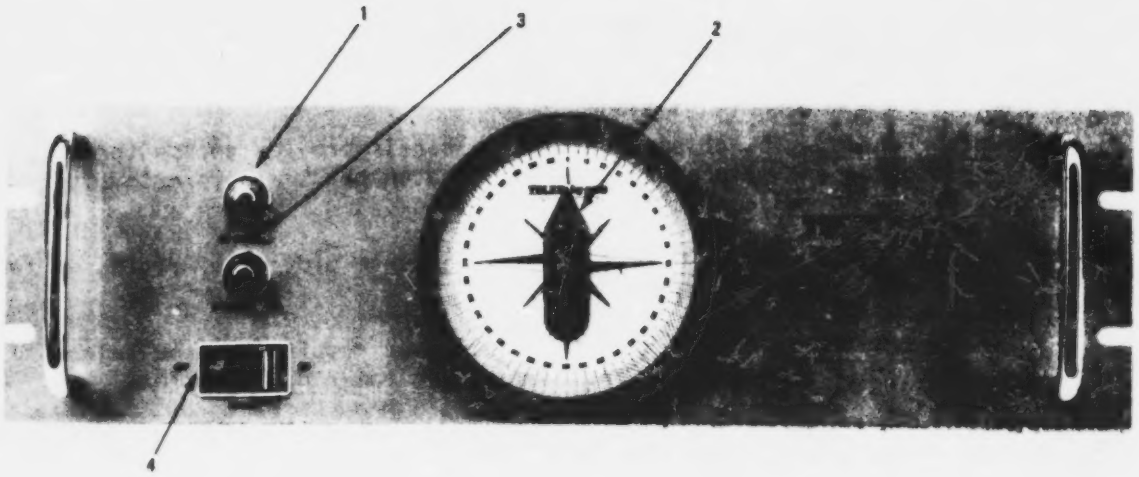


Figure 1-5. RF Patch Panel



LP ANTENNA CONTROL/
INDICATOR
2A2 THRU 2A5 IN
CONTROL INTERFACE
OK-449(V)/FRC-176(V)

THESE CONTROLS ARE PROVIDED, ONE PER AS-3515 ROTATABLE LOG PERIODIC ANTENNA, FOR DIRECTIONAL CONTROL. POSITION AZIMUTH CONTROL TO POINT ANTENNA IN DESIRED DIRECTION.

Figure 1-6. Antenna Indicator/Control Panel

CHAPTER 2

OPERATION

This chapter contains instructions for operating Radio Communications System AN/FRC-176(V). The information is presented in three sections. Section I identifies, illustrates, and briefly describes the functions of operational controls and indicators. Section II contains procedures for turning on, operating, and turning off the equipment. Section III contains emergency operating procedures.

Section I. CONTROLS AND INDICATORS

2-1. COMMUNICATION CONTROL CONSOLE OJ-512/FRC-176(V) CONTROLS AND INDICATORS

The controls and indicators for each assembly in the Communication Control Console are tabulated below. Because the assemblies in the operator B position are identical to the assemblies in the operator A position, only the controls and indicators for operator A are presented.

a. RF-901A Phone Patch Panel 1A1 and 4A1. Controls and indicators for this RF-901A Phone Patch are illustrated in figure 2-1 and listed in table 2-1.

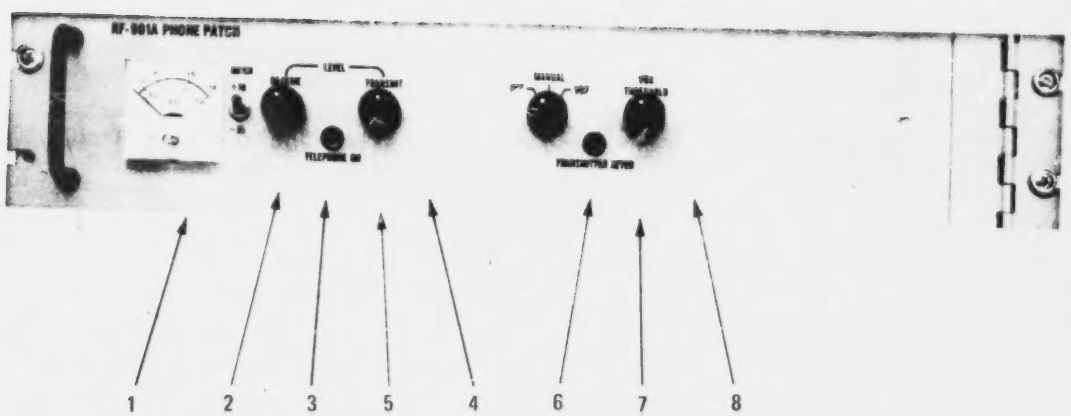


Figure 2-1. RF-901A, Phone Patch 1A1 and 4A1, Controls and Indicators

Table 2-1. RF-901A, Phone Patch Panel 1A1 and 4A1, Controls and Indicators

Figure 2-1 Index Number	Control or Indicator	Function
1	Meter	With Balance switch set at NORMAL: a. During periods of radio reception indicates the audio level being applied to the phone lines from the radio set receiver. b. During periods of radio set transmission, indicates the audio level being applied to the transmitter for modulation from the telephone line. With Balance switch set at NULL: Indicates level of audio signal from radio set for null adjustment of resistor bridge.
2	METER Switch	Provides for either a high range scale (-10 to +10 dB) when set at +10 or a low range scale (-10 to -30 on the front panel meter.
3	RECEIVE LEVEL Control	Adjusts the level of the audio signal being applied to the phone lines. Normally set for a 0 dBm output as indicated by the meter.
4	TRANSMIT LEVEL Control	Adjusts the level of the audio signal being applied to the radio set transmitter from the phone lines. Normally set for 100% modulation of voice peaks.
5	TELEPHONE ON light	Indicates, when illuminated, that dc power is supplied and the Function switch is in one of the two operating modes.
6	Function Switch	Position — Function OFF — Disconnects both the radio set (audio, keyline, and +12V) and the telephone lines from the RF-901A unit. VOX — Energizes the RF-901A circuitry to provide telephone interface with the receive and transmit circuitry of the radio set.

Table 2-1. RF-901A, Phone Patch Panel 1A1 and 4A1, Controls and Indicators (Cont.)

Figure 2-1 Index Number	Control or Indicator	Function
6 (Cont.)		Position: MANUAL — Function: Disconnects the radio set keyline from the RF-901A VOX circuitry. Normally used when manual keying is required by the operator using the RF-920 Transmit Foot Switch or if the radio set is equipped with an internal VOX feature.
7	TRANSMITTER KEYED light	Indicates, when illuminated, that the radio set is being keyed by the RF-901A.
8	VOX Threshold Control	Provides continuous adjustment of the VOX threshold level from -25 dBm to -5 dBm depending on the level of the received signal on the four wire side (radio set).
	Balance Switch (rear panel)	When set at NULL, provides a signal to the meter for balancing the input/output resistive bridge. NORMAL position provides for monitoring of input and output audio levels by the meter.

b. Audio Monitor Panel, 1A2 and 4A2, Controls and Indicators. Controls and indicators for the Audio Monitor Panel are illustrated in figure 2-2 and listed in table 2-2.

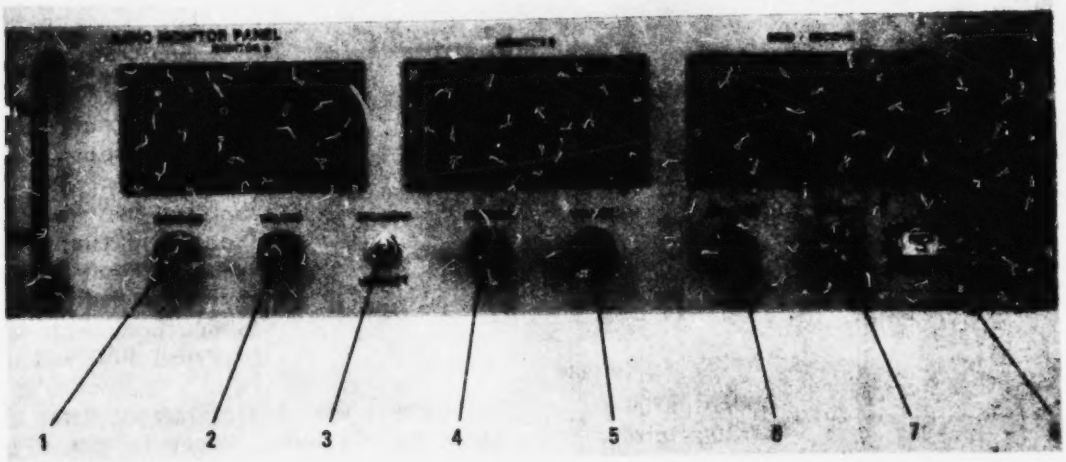


Figure 2-2. Audio Monitor Panel, 1A2 and 4A2, Controls and Indicators

Table 2-2. Audio Monitor Panel, 1A2 and 4A2, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	SQUELCH Control (MONITOR A)	Controls MON A audio squelch level.
2	VOLUME Control (MONITOR A)	Varies level of MON A audio.
3	SPEAKERS/HEADSET Switch	Selects MON A audio, MON B audio, or SEND/RECEIVE audio for routing to panel speakers or to headset.
4	SQUELCH Control (MONITOR B)	Controls MON A audio squelch level.
5	VOLUME Control (MONITOR B)	Varies level of MON B audio.
6	SQUELCH Control (Send/Receive)	Controls SEND/RECEIVE audio squelch level.
7	VOLUME Control (Send/Receive)	Varies level of SEND/RECEIVE audio.
8	POWER ON/OFF Switch	Controls ac power input to the Audio Monitor.

c. Telephone Switch/Dial Panel, 1A3 and 4A3, Controls and Indicators. Controls and indicators for the Telephone Switch/Dial Panel are illustrated in figure 2-3 and listed in table 2-3.

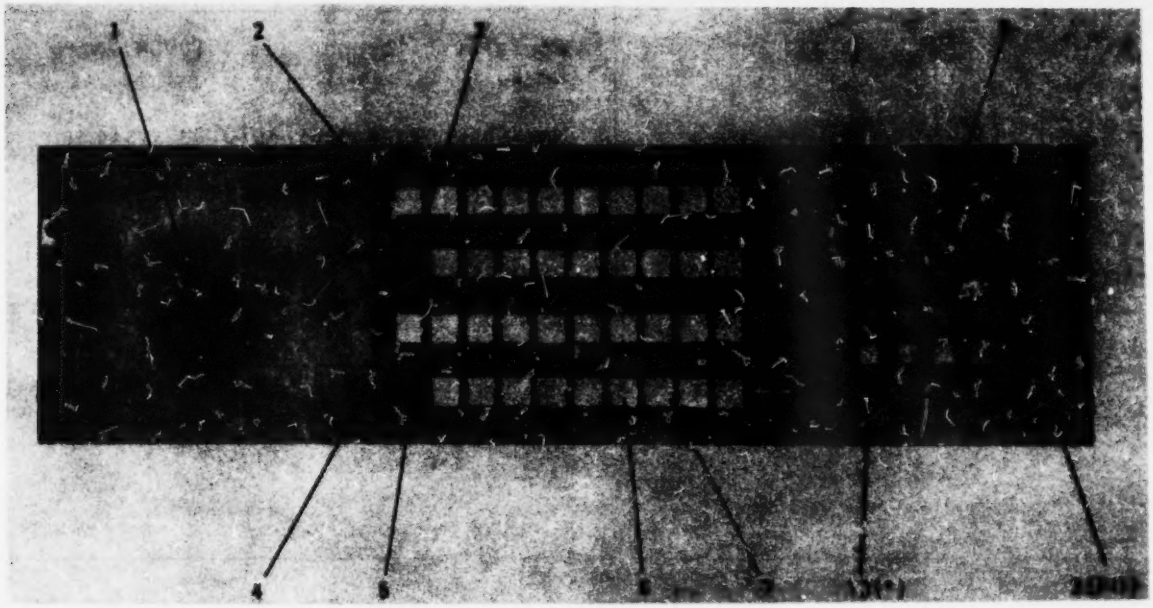


Figure 2-3. Telephone Switch/Dial Panel, 1A3 and 4A3, Controls and Indicator

Table 2-3. Telephone Switch/Dial Panel, 1A3 and 4A3, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	SONALERT	Provides audible indication of an incoming call.
2	Radio Patch Switches (12)	Connects telephone line to transceiver.
3	RLS (Release)	Disconnects Radio Patch switches.
4	Trunk Connect	Connects operator to any of 12 trunk lines.
5	HOLD	Enables operator to place calling party on hold.
6	RADIO	Enables operator to talk over transceiver using handset.
7	ICOM (Intercom)	Enables operator to use handset for intercom functions.

Table 2-3. Telephone Switch/Dial Panel, 1A3 and 4A3, Controls and Indicators(Cont.)

Reference Designator	Control or Indicator	Function
8	Keypad	Contains telephone and AUTOVON entry keys.
9	AUTOVON	Keys used to access AUTOVON system.
10	Rotary Dial Bypass	When pressed, key bypasses tone-to-rotary dial converters. Allows operator to access tone (DTMF) central exchanges.

d. Headset/Lamp Test Panel, 1A5 and 4A5, Controls and Connectors. Controls and connectors for the Headset/Lamp Test Panel are illustrated in figure 2-4 and listed in table 2-4.

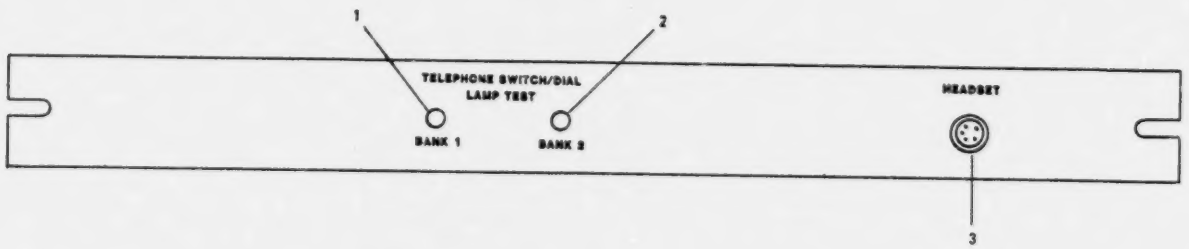


Figure 2-4. Headset/Lamp Test Panel, 1A5 and 4A5, Controls and Connectors

Table 2-4. Headset/Lamp Test Panel, 1A5 and 4A5, Controls and Connectors

Reference Designator	Control or Connector	Function
1	BANK 1 Momentary Switch	When pressed, switch illuminates lamps in first bank of trunk select switches in Telephone Switch/Dial Panel.
2	BANK 2 Momentary Switch	When pressed, switch illuminates lamps in second bank of trunk select switches in Telephone Switch/Dial Panel.
3	HEADSET	Provides connections for headset to Console.

e. Tape Control Assembly, 2A1 and 5A1, Controls and Indicators. Controls and indicators for the Tape Control Assembly are described in four groups:

- Tape Transport Controls (figure 2-5)
- Playback Controls (figure 2-6)
- Record Controls (figure 2-7)
- Rear Panel Controls and Indicators (figure 2-8)

(1) Tape Transport Controls

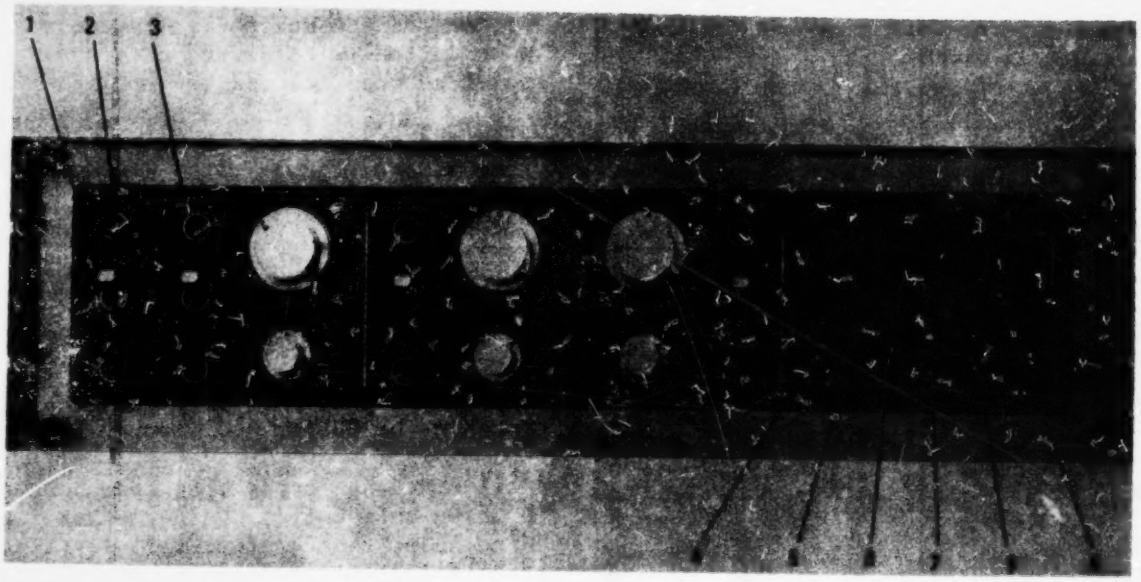


Figure 2-5. Tape Transport Controls

Table 2-5. Tape Transport Controls

Reference Designator	Control or Indicator	Function
1	POWER ON/OFF Switch	Applies ac power to the tape control assembly, and to the tape transport unit.
2	SPEED 15/16 Pushbutton	Selects tape speed of 15/16 ips.
3	SPEED 1-7/8 Pushbutton	Selects tape speed of 1-7/8 ips. Tape speed may be changed during any operating mode.

Table 2-5. Tape Transport Controls (Cont.)

Reference Designator	Control or Indicator	Function
4 to 9	Tape transport buttons	The tape transport buttons (4) to (9) need only to be tapped to activate the desired function. They may be operated in any sequence without hesitation, because all functions are electrically interlocked and each command is stored electronically.
4	PAUSE	This control interrupts any tape motion so long as the button is kept depressed. When button is released, originally selected mode resumes.
5	<< FAST REWIND	With the sliding button (ref. table 2-9 item 3, and fig. 2-9 item 3) in the cutter position, the buttons for fast forward and rewind will respond only as long as they are held depressed. This facilitates motor assisted search operations by simply alternating between these two buttons. NOTE: In order to keep headwear to a minimum, do not wind long sections of tape in the cutter position.
6	>> FAST FORWARD	
7	PLAY	Activates the reproducing mode. When pushing this button during either fast wind mode, the recorder will first come to a full stop, which is then followed immediately by the activation of the reproducing mode.
8	STOP	Cancels any selected tape transport mode.
9	RECord	To activate the recording mode, the buttons REC and PLAY (7) have to be pressed simultaneously. The REC button has no effect when pressed alone so as to guard against accidental tape erasure.

(2) Playback Controls

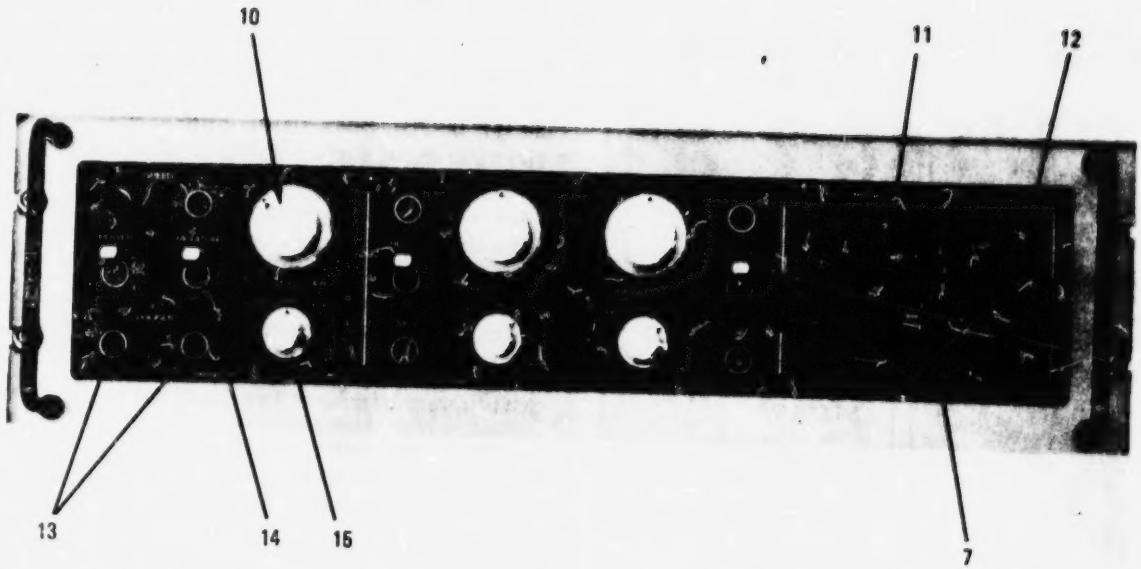


Figure 2-6. Playback Controls

Table 2-6. Playback Controls

Reference Designator	Control or Indicator	Function
10	VOLUME	The tandem potentiometer VOLUME varies the level for headphone listening. The inner large ring controls left channel volume while the smaller outer knob varies right channel volume. Both controls are connected via a slip-clutch thus permitting their individual adjustment to achieve the desired balance.
11	Recording level indicator LEFT CHANNEL	The modulation meters indicate either the reproduced level from tape or the input level during recording (depending on the position of the TAPE/INPUT switch (14)).
12	Recording level indicator RIGHT CHANNEL	

Table 2-6. Playback Controls (Cont.)

Reference Designator	Control or Indicator	Function
13	Output PHONES	Output plugs provide for connecting stereophonic headphones with an impedance of 200 ohms or higher. Phones may be plugged into either jack.
14	MONITOR switch TAPE/INPUT	Allows the signal to be monitored off the tape or directly from the input. With tape not moving, switch should be in INPUT position. During PLAYBACK, switch should be in TAPE position. During a recording, either position may be selected, depending on the preferred listening mode (before/after tape monitoring).
15	Mode selector MONITOR	Selects signal mode appearing at outputs and at modulation meters.
	STEREO	Both channels are kept separate.
	REVERSE	Stereophonic mode is retained. Left and right channels are interchanged including level indication.
	LEFT	Left channel only.
	RIGHT	Right channel only.
	MONO	Left and right channel signals appear combined on both outputs.

(3) Record Controls

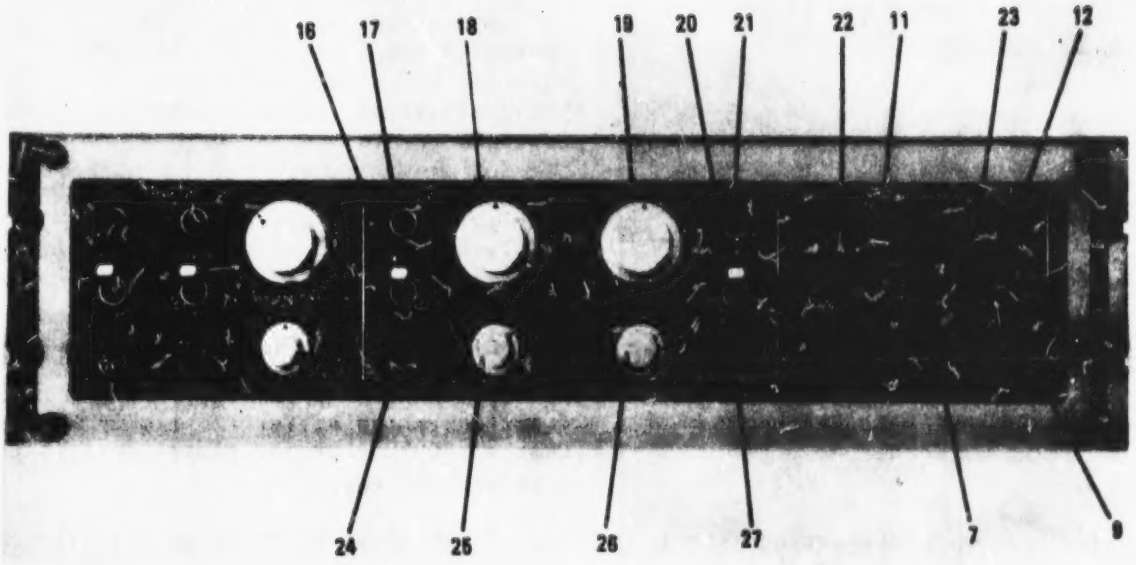


Figure 2-7. Record Controls

Table 2-7. Record Controls

Reference Designator	Control or Indicator	Function
16	Record preselector REC L, ON/OFF	The switch REC L preselects the function recording for the left channel (on). The selected function becomes activated when simultaneously pressing the buttons PLAY and REC. Recording on either the left or right channel is not possible with the respective preselector in the OFF position (protection against unintentional recording or erasure of a track).
17	Recording light, left channel	This light illuminates as soon as all conditions for recording on the left channel are met (REC L in position ON, buttons PLAY and REC activated). An existing recording on that track will be erased.

Table 2-7. Record Controls (Cont.)

Reference Designator	Control or Indicator	Function
18	INPUT LEVEL, left channel	The potentiometer INPUT LEVEL/RECORD LEFT adjusts the recording level (degree of modulation) for the left channel. An unused level control should always be turned to zero position.
19	INPUT LEVEL, right channel	The potentiometer INPUT LEVEL/RECORD RIGHT adjusts the recording level (degree of modulation) for the right channel. An unused level control should always be turned to zero position.
20	Preselector REC R, ON/OFF	The switch REC R preselects the function recording for the right channel (ON). For additional details refer to Ref. Desig. (16) .
21	Recording light, right channel	This light illuminates as soon as all conditions for recording on the right channel are met (REC R in position ON, buttons PLAY and REC activated). An existing recording on that track will be erased.
22	Overmodulation indicator, left channel	The LED dots are capable of indicating extremely short overlaod peaks which are not shown by the VU-meters. An erratic flashing of these light dots suggests that the recording level should be lowered in order to avoid overmodulation and resulting signal distortion.
23	Overmodulation indicator, right channel	
24	MICrophone input, left channel	Permits the connecting of low and high impedance microphones. The microphone's jack plug must be fully inserted into the socket.
25	Input selector, left channel	The following inputs or signal sources may be selected with these switches.

Table 2-7. Record Controls (Cont.)

Reference Designator	Control or Indicator	Function
26	Input selector, right channel	MIC LO for low level microphones. MIC HI for high level microphones (e.g. condensor microphones with built-in preamplifier). NOTE: A change from MIC LO to MIC HI is indicated when the signal from the microphone is of such magnitude that full modulation (0 VU) is still obtained, even when the respective input control (18) or (19) is turned down to position 2. RADIO selects socket (31) (stereo receiver or radio-equipped with DIN output). R-L to transfer a recording from the right channel to the left channel. L-R to transfer a recording from the left channel to the right channel. AUX selects socket (32) (for signal sources such as tuners, amplifiers, mixing consoles).
27	MICrophone input, right channel	Permits the connecting of low and high impedance microphones. The microphone's jack plug must be fully inserted into the socket.

(4) Rear Panel Controls and Indicators

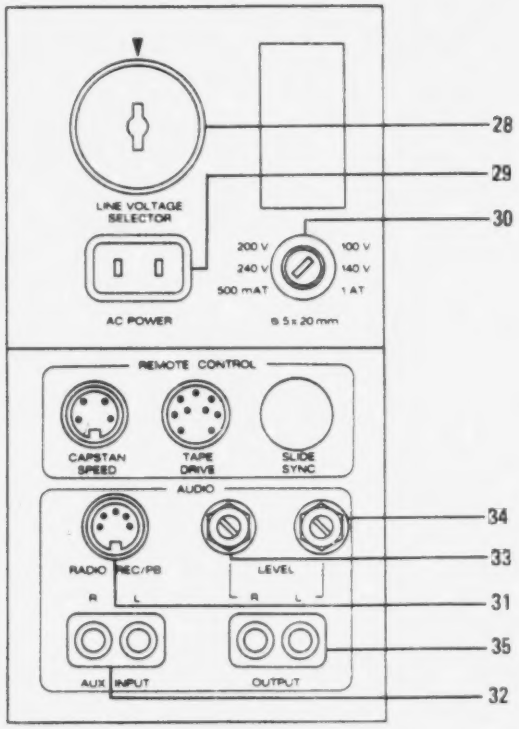


Figure 2-8. Rear Panel, Controls and Connectors

Table 2-8. Rear Panel, Controls and Connectors

Reference Designator	Control or Indicator	Function
28	LINE VOLTAGE SELECTOR	The number opposite the arrow must agree with the nominal line voltage at the point of use. Remove ac power to unit before operating LINE VOLTAGE SELECTOR.
29	AC POWER inlet	Make sure LINE VOLTAGE SELECTOR (28) is set to proper value.

Table 2-8. Rear Panel, Controls and Connectors (Cont.)

Reference Designator	Control or Indicator	Function
30	FUSE	When changing a fuse, disconnect the recorder from the electric current supply. Unscrew cap from fuse holder. Insert new miniature fuses 5 x 20 mm in accordance with the following voltage ranges: 200 - 240 volts: 500 mA slow blow, 100 - 140 volts: 1 A slow blow (500 mA equals 0.5 A and 1 A equals 1000 mA).
31	DIN socket RADIO	For radios equipped with a DIN connector.
32	Phono socket AUX INPUT	For signal sources such as amplifiers, mixing consoles, tape recorders, etc. Observe channel assignment: L = Left (CH 1), R = Right (CH 11).
33 34	LEVEL R (right) LEVEL L (left)	These potentiometers serve to adjust the levels appearing on the sockets OUTPUTS (25) and RADIO (21). Normally both OUTPUT controls will be set to their maximum (full clockwise rotation).
35	Phono sockets OUTPUT	To feed other system components such as an amplifier, tape recorder, receiver etc. Observe channel assignment: L = Left (CH1), R = Right (CH 11).

f. Tape Transport Unit, 1A6 and 4A6, Controls and Indicators. Controls and indicators for the Tape Transport Unit are illustrated in figure 2-9 and listed in table 2-9.

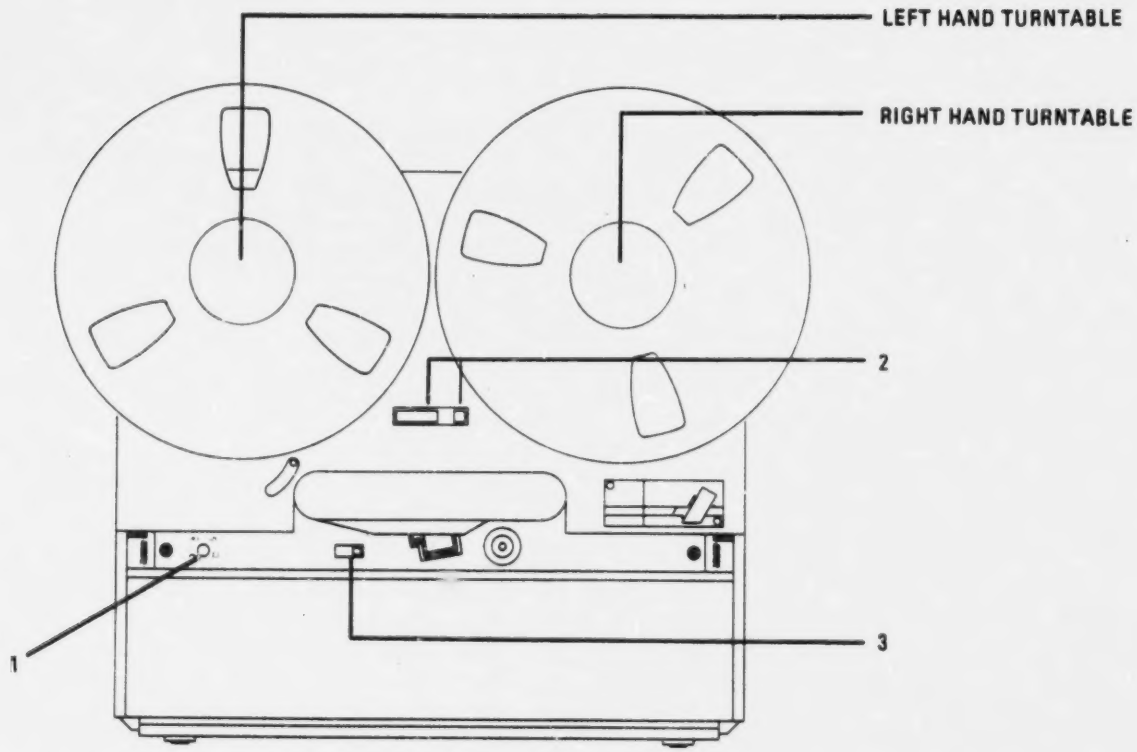


Figure 2-9. Tape Transport Unit, 1A6 and 4A6, Controls and Indicators

Table 2-9. Tape Transport Unit, 1A6 and 4A6, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	REEL SIZE Selector	Control is pressed in for seven inch reels and released (OUT position) for ten inch reels.
2	Tape Counter	Enables operator to locate specific sections of tape. Reset button sets counter to "0000".
3	Sliding Button Editor	In the STOP position, tape is brought into contact with the magnetic heads with reproducing amplifier activated. In this manner, the locating of an edit point or the start of a recording on tape is possible by manually rotating the tape reels. The edit position can be released by operating the pushbutton PLAY or by pushing the pinch roller arm slightly in the direction towards the capstan shaft.

g. Audio/Keyline Switch Panel, 2A2 and 5A2, Controls and Indicators. Controls and indicators for the Audio/Keyline Switch Panel are illustrated in figure 2-10 and listed in table 2-10.

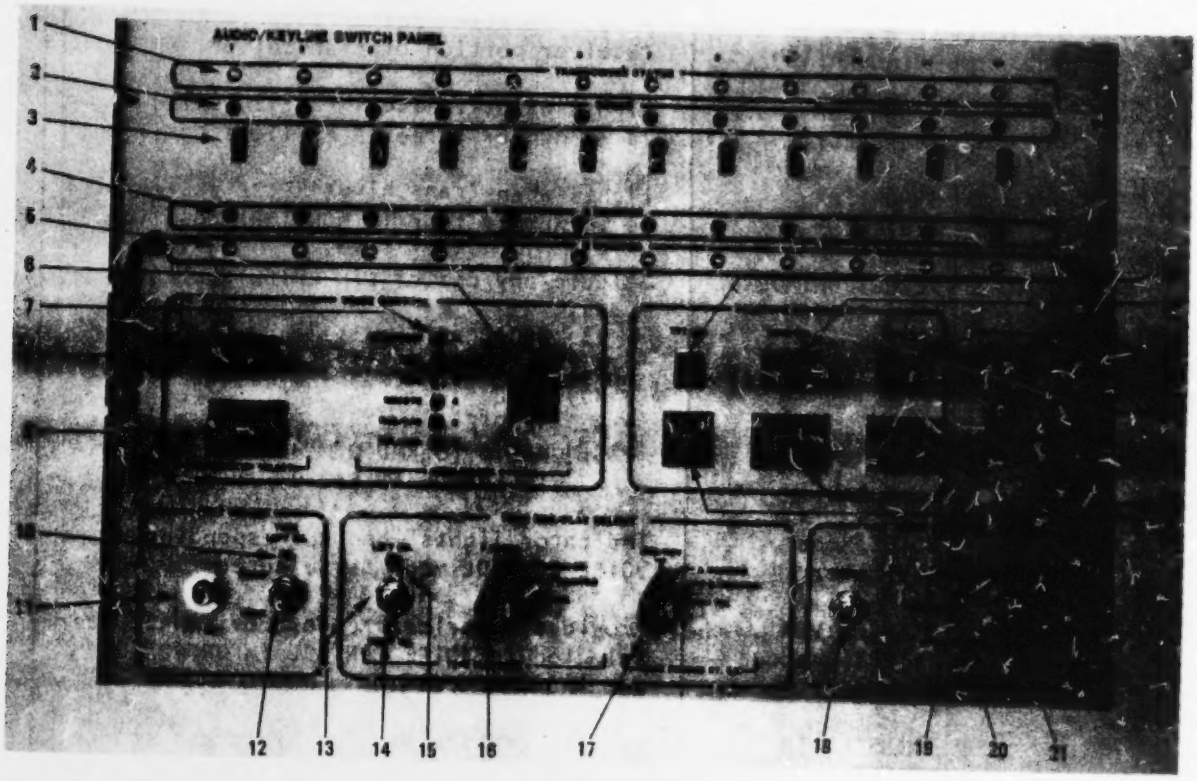


Figure 2-10. Audio/Keyline Switch Panel, 2A2 and 5A2, Controls and Indicators

Table 2-10. Audio/Keyline Switch Panel, 2A2 and 5A2, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	TRANSCEIVER STATUS Indicator	When lit, indicates that those numbered Radio Sets are assigned to that operator. Status, mode, and frequency assignments are under control of that operators Remote Control Unit.
2	SEIZED Indicator	Lights when Transceiver SEIZE switch is in number two position (SEIZED).

Table 2-10. Audio/Keyline Switch Panel, 2A2 and 5A2, Controls and Indicators (Cont.)

Reference Designator	Control or Indicator	Function
3	Transceiver SEIZE Switch	A four-position switch used to monitor receiver portion of transceiver.
4	A MONITOR Indicator	Lights when Transceiver SEIZE switch is in number three (A MONITOR) position.
5	B MONITOR Indicator	Lights when Transceiver SEIZE switch is in number four (B MONITOR) position.
6	VOICE CONTROL Mode SELECT Switch	Selects any one of six VOICE CONTROL modes: 1. BROADCAST 2. MICROPHONE 3. TAPE 4. REMOTE 5. RADIO TO RADIO 6. TELEPHONE TO RADIO
7	VOICE Mode Indicator	Indicator lights when corresponding VOICE CONTROL mode is selected.
8	TRANSCEIVER SELECT Readout Indicator	Provides numerical readout of transceiver selected in VOICE CONTROL in BROADCAST and RAD/RAD modes.
9	TRANSCEIVER SELECT Switch	Selects transceiver for broadcast source when (6) is set to BROADCAST. Also seizes one of two transceivers for RAD/RAD patch.
10	TAPE LEFT CH. Indicator	When illuminated, indicates that operator comments are being recorded on TAPE LEFT CH. When light goes out, send and receive traffic is recorded on right channel.
11	PTT (Push-to-Talk)	Provides operator with manual keyline control of Radio Set.
12	BOOM/HDST Switch	Allows operator to select boom microphone or headset microphone.
13	Tape Channel Select Switch	On playback mode, selects either left channel (operator's comments) or right channel (send/receive traffic).

Table 2-10. Audio/Keyline Switch Panel, 2A2 and 5A2, Controls and Indicators (Cont.)

Reference Designator	Control or Indicator	Function
14	RIGHT CH. Indicator	Lights when Tape Channel Select switch is in right channel (send/receive) position.
15	LEFT CH. Indicator	Illuminates when Tape Channel Select switch is in left channel (operator comment) position.
16	Tape Playback Mode Selector Switch	Selects any one of four playback modes: • REMOTE • A MONITOR • B MONITOR • TELEPHONE
17	Tape Record Select Switch	Selects any of four record modes: • SEND/RECEIVE • A MONITOR • B MONITOR • TELEPHONE
18	ENABLE Switch	When in ON (up) position, switch enables console VOX circuitry. Used in RAD/RAD mode to permit two transceivers to key each other automatically.
19	VOX A Indicator	When in manual keyline mode (ENABLE switch off), indicator illuminates when operator keys Transceiver A.
20	VOX B Indicator	When in manual keyline mode (ENABLE switch off), indicator illuminates when operator keys Transceiver B.
21	AUTO Switch	When in manual keyline mode (ENABLE switch off), switch is used to key manually either Transceiver A or Transceiver B.
22	TTY SEL Switch	Selects any one of four teletype machines.
23	TTY SEL Readout	Provides numerical readout of TTY machine selected.
24	RCVR SEL	Selects transceiver receiver for TTY operation. Operating either RCVR SEL or XMTR SEL switches automatically overrides VOICE CONTROL modes and places console in TTY mode.

Table 2-10. Audio/Keyline Switch Panel, 2A2 and 5A2, Controls and Indicators (Cont.)

Reference Designator	Control or Indicator	Function
25	RCVR SEL Readout	Provides numerical readout of receiver selected.
26	XMTR SEL Switch	Selects transceiver transmitter for TTY operation. Operating either RCVR SEL or XMTR SEL switches automatically overrides VOICE CONTROL modes and places Console in TTY mode. (Normal range transceiver is used for both send and receive, but functions may be divided between different transceivers.)
27	XMTR SEL Readout	Provides numerical readout of transmitter selected.
28	TTY MONITOR Switch	When in TTY mode, allows operator to monitor XMTR TTY audio or RCVR TTY audio by holding switch in either position.

h. Status Monitor Unit, 3A1 and 3A3, Controls and Indicators. Controls and Indicators in the Status Monitor Unit are illustrated in figure 2-11 and in table 2-11.

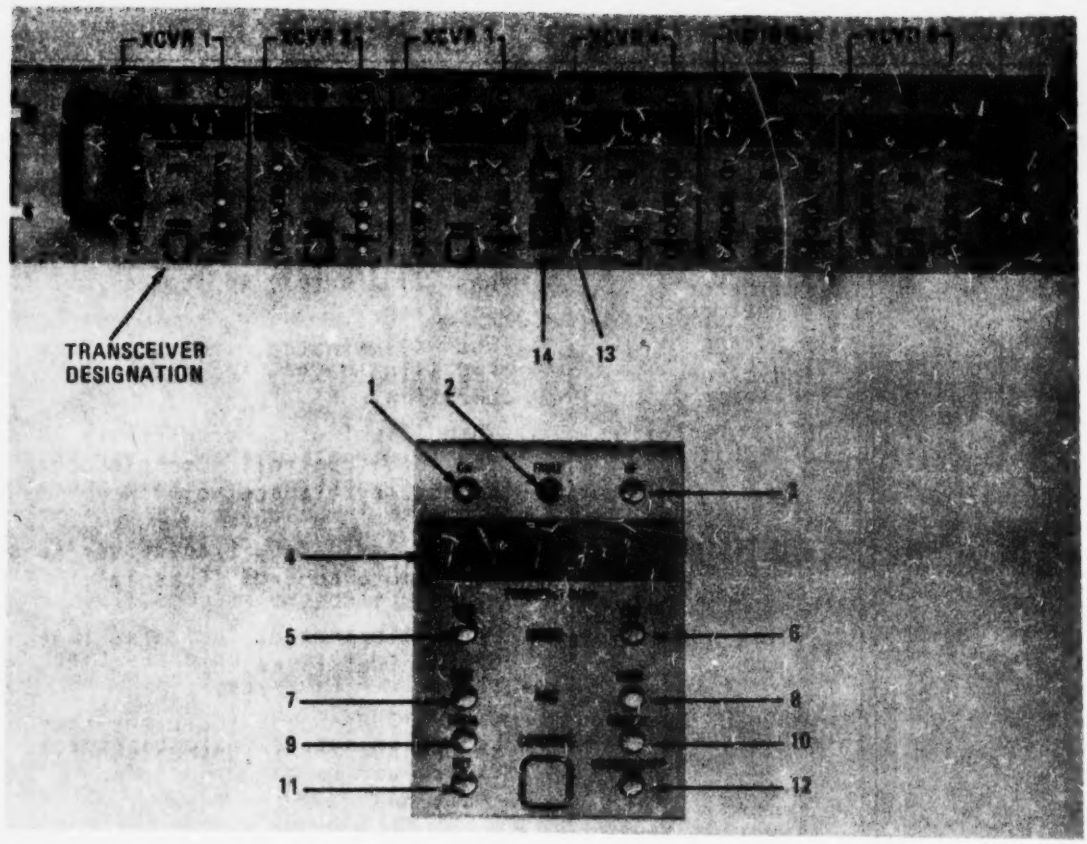


Figure 2-11. Status Monitor Unit, 3A1 and 3A3, Controls and Indicators

Table 2-11. Status Monitor Unit, 3A1 and 3A3, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	ON Indicator	When illuminated, indicates that power is applied to transceiver.
2	FAULT Indicator	When illuminated, indicates a fault in the transceiver.
3	RF Indicator	When illuminated, indicates RF output from the transceiver.
4	FREQUENCY Readout	Provides readout in kHz of transceiver frequency.
5	USB Indicator	When illuminated, indicates that transceiver is in USB mode.

Table 2-11. Status Monitor Unit, 3A1 and 3A3, Controls and Indicators (Cont.)

Reference Designator	Control or Indicator	Function
6	LSB Indicator	When illuminated, indicates that transceiver is in LSB mode.
7	FAST AGC Indicator	When illuminated, indicates FAST AGC operation.
8	SLOW AGC Indicator	When illuminated, indicates SLOW AGC operation.
9	LOCAL Indicator	When illuminated, transceiver is set for local control. Console operator cannot key transceiver.
10	REMOTE Indicator	When illuminated, transceiver is set for remote control (Console).
11	KEY	When illuminated, indicates that transceiver is keyed.
12	UNSQUELCHED	When illuminated, indicates that transceiver is in unsquelched condition.
13	LAMP TEST Button	When pressed, applies power to all indicator lights in Status Monitor Unit, Lamp Test control also activates SONALERT in console.
14	ALARM RESET Button	Silences SONALERT alarm which has been activated by fault in transceiver. FAULT indicator (2) remains illuminated after SONALERT alarm is shut off if fault condition exists.

i. Remote Control-Monitor Unit, 3A2 and 3A4, Controls and Indicators. Controls and indicators for the Remote Control-Monitor Unit are illustrated in figure 2-12 and listed in table 2-12.

NOTE

The term "RCU" is used to describe the Remote Control-Monitor Unit of the Remote Control-Monitor C-11021/URC. The RCU is installed in the Communication Control Console. The "LCU" is used to describe the three Local Control Unit PWBs of the Remote Control-Monitor. The three PWBs are located in the Processor-Interface Unit CP-1479/URC of the Radio Set (transceiver).

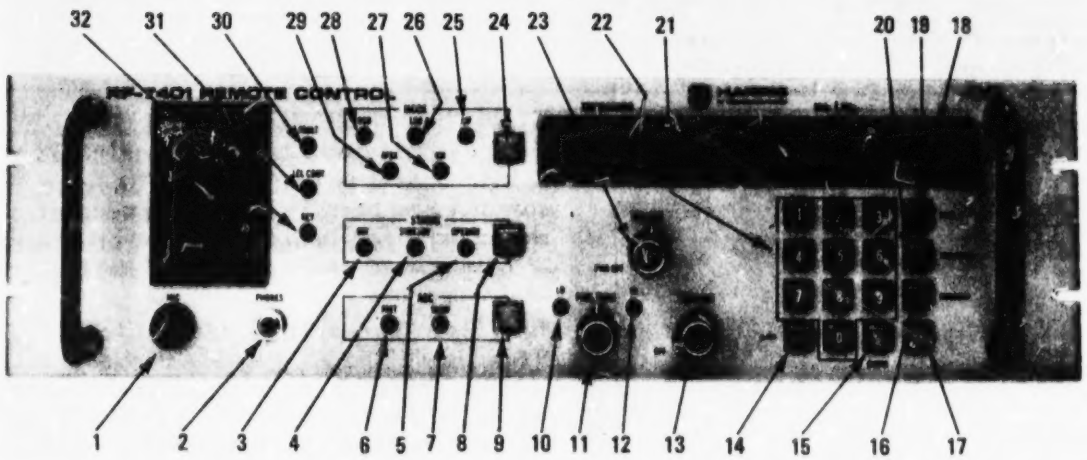


Figure 2-12. Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators

Table 2-12. Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	MIC*	Microphone input connector. Will accept either a dynamic or a carbon type microphone.
2	PHONES*	Telephone type headphone jack. This jack is in parallel with the front panel speaker, and disables the speaker when it is used.
3	OFF (PA STATUS)	When illuminated, this LED indicates either that the OFF (STATUS) command has been selected to be sent to the controlled Radio Set's PA or the LED indicates the last polled STATUS of the controlled Radio Set's PA.
4	STANDBY (PA STATUS)	When illuminated, this LED indicates either that the STANDBY (STATUS) command has been selected to be sent to the controlled Radio Set's PA or the LED indicates the controlled Radio Set's PA in Standby.

*This function is not active in the Remote Control-Monitor as currently configured.

Table 2-12. Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
5	OPERATE (PA STATUS)	When illuminated, this LED indicates either that the OPERATE (STATUS) command has been selected to be sent to the controlled Radio Set's PA or the LED indicates the controlled Radio Set's PA in Operate.
6	FAST (AGC)	When illuminated, this LED indicates either that the FAST (AGC) command has been selected to be sent to the controlled Radio Set's PA or the LED indicates the last polled AGC mode of the controlled Radio Set.
7	SLOW (AGC)	When illuminated, this LED indicates either that the SLOW (AGC) command has been selected to be sent to the controlled Radio Set or the LED indicates the last polled AGC mode of the controlled Radio Set.
8	STATUS	Depressing this pushbutton sequentially selects the STATUS command (OFF, STANDBY, or OPERATE) that is to be sent to the controlled Radio Set. To implement the selected STATUS, the "ENTER" pushbutton must be pressed.
9	AGC	Depressing this pushbutton sequentially selects the AGC mode command (FAST or SLOW) that is to be sent to the controlled Radio Set. To implement the selected AGC Mode, the "ENTER" pushbutton must be pressed.
10	LO (FINE TUNE)	When illuminated, this LED indicates that the clarifier frequency of the controlled Radio Set is below the nominal frequency selected.
11	FINE TUNE	This two spring-loaded three position switch controls the receiver clarifier of the selected Radio Set. Turning the FINE TUNE switch toward LO tunes the frequency of the controlled Radio Set down; turning the FINE TUNE switch toward HI tunes the frequency of the controlled Radio Set up.

Table 2-12. Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
		NOTE When both the HI and LO LEDs are not illuminated, this indicates the controlled Radio Set is at the frequency selected.
12	HI (FINE TUNE)	When illuminated, this LED indicates that the clarifier frequency of the controlled Radio Set is above the frequency selected.
13	SQUELCH*	This switch/potentiometer controls the level at which squelch is applied to the audio from OFF to fully squelched.
14	ENTER	Depressing this momentary pushbutton switch causes all operator selected commands to be transmitted to the Radio Set whose I.D. is displayed in the TRANSCEIVER display.
15	CURSOR	This momentary pushbutton switch can be used to set up commands in the FREQUENCY, or the TRANSCEIVER, or the CHANNEL (this option is not currently used) fields of the front panel displays. Entering any one of these setup modes initiates the automatic increment CURSOR mode and the left most seven-segment display of the selected field will begin to blink. The blinking indicates the location of the CURSOR. The position of the CURSOR shows where the next numeric keypad entry will be placed in the display. For each depression of the CURSOR pushbutton the CURSOR will move to the next seven-segment display to the right until it reaches the right most segment, then it will wrap around to the left most segment of the display. The digit entered into the seven-segment of display, at the CURSOR position, can be changed as many times as the operator wants to, until the ENTER, or the CURSOR, or one of the field selected (FREQUENCY, TRANSCEIVER OR CHANNEL) pushbuttons is depressed, at which time an entered command will be sent and the CURSOR will be eliminated or

*This function is not active in the Remote Control-Monitor as currently configured.

Table 2-12. Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
		the CURSOR will advance to the next segment, or appear at the left most segment of the next setup mode selected.
16	FREQUENCY	This momentary pushbutton switch will select the FREQUENCY field for numeric keypad entries and initialize the automatic increment CURSOR mode at the left most FREQUENCY display segment.
17	Channel* (Optional Setup Mode)	This momentary pushbutton switch will select the CHANNEL field for numeric keypad entries and initialize the automatic increment CURSOR mode at the left most CHANNEL display segment.
18	Frequency (kHz)	This is a six-position seven-segment display in kHz commanded or readback FREQUENCY information for the selected Radio Set. The FREQUENCY display is also utilized to display the alpha-numeric messages concerning the system.
19	FAULT	If the FAULT LED is lit, pressing this pushbutton tells the operator what type of fault is present. If the FAULT LED is not lit, this momentary pushbutton switch initiates the RCU and LCU CPU Self-Tests.
20	TRANSCEIVER	This momentary pushbutton switch will select the TRANSCEIVER field for numeric keypad entries and initialize the automatic increment CURSOR mode at the left most TRANSCEIVER display segment.
21	Numeric Keypad (0-9)	These 10 momentary pushbutton switches are used to enter numeric commands after one of the following fields has been selected: FREQUENCY, TRANSCEIVER, or CHANNEL.*
22	TRANSCEIVER	This is a two-position seven-segment display field which displays the I.D. number of the selected Radio Set.

*This function is not active in the Remote Control-Monitor as currently configured.

Table 2-12. Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
23	VOLUME* (PWR OFF/ON)	This switch/potentiometer controls the RCU as power off/on and the volume of the received audio at the front panel speaker or the headphones.
24	MODE	Depressing this pushbutton sequentially selects the MODE command (USB, LSB, AM, CW, or AFSK) that is to be sent to the controlled Radio Set. To implement the selected mode, the ENTER pushbutton must be pressed.
25	AM (MODE)	When illuminated, this LED indicates either that the AM (MODE) command has been selected to be sent to the controlled Radio Set or the LED indicates the last polled MODE of the controlled Radio Set.
26	LSB (MODE)	When illuminated, this LED indicates either that the LSB (MODE) command has been selected to be sent to the controlled Radio Set or the LED indicates the last polled MODE of the controlled Radio Set.
27	CW (MODE)	When illuminated, this LED indicates either that the CW (MODE) command has been selected to be sent to the controlled Radio Set or the LED indicates the last polled MODE of the controlled Radio Set.
28	USB (MODE)	When illuminated, this LED indicates either that the USB (MODE) command has been selected to be sent to the controlled Radio Set or the LED indicates the last polled MODE of the controlled Radio Set.
29	AFSK* (MODE)	When illuminated, this LED indicates either that the AFSK (MODE) command has been selected to be sent to the controlled Radio Set or the LED indicates the last polled MODE of the controlled Radio Set.

*This function is not active in the Remote Control-Monitor as currently configured.

Table 2-12. Remote Control-Monitor Unit, C-11021/URC, 3A2 and 3A4, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
30	FAULT	This LED illuminates whenever there is a FAULT at the selected Radio Set. Depressing the FAULT pushbutton displays the fault type.
31	LCL CONT	This LED illuminates to indicate that the selected Radio Set is under LOCAL CONTROL.
32	KEY	This LED illuminates any time the selected Radio Set is keyed.

2-2. RADIO SET AN/URC-103(V)1, CONTROLS AND INDICATORS

Controls and indicators for each assembly in the Radio Set are located and identified in the following sections.

a. Preselector F-1520/URC, Controls and Indicators. Controls and indicators for the Preselector are illustrated in figure 2-13 and listed in table 2-13.

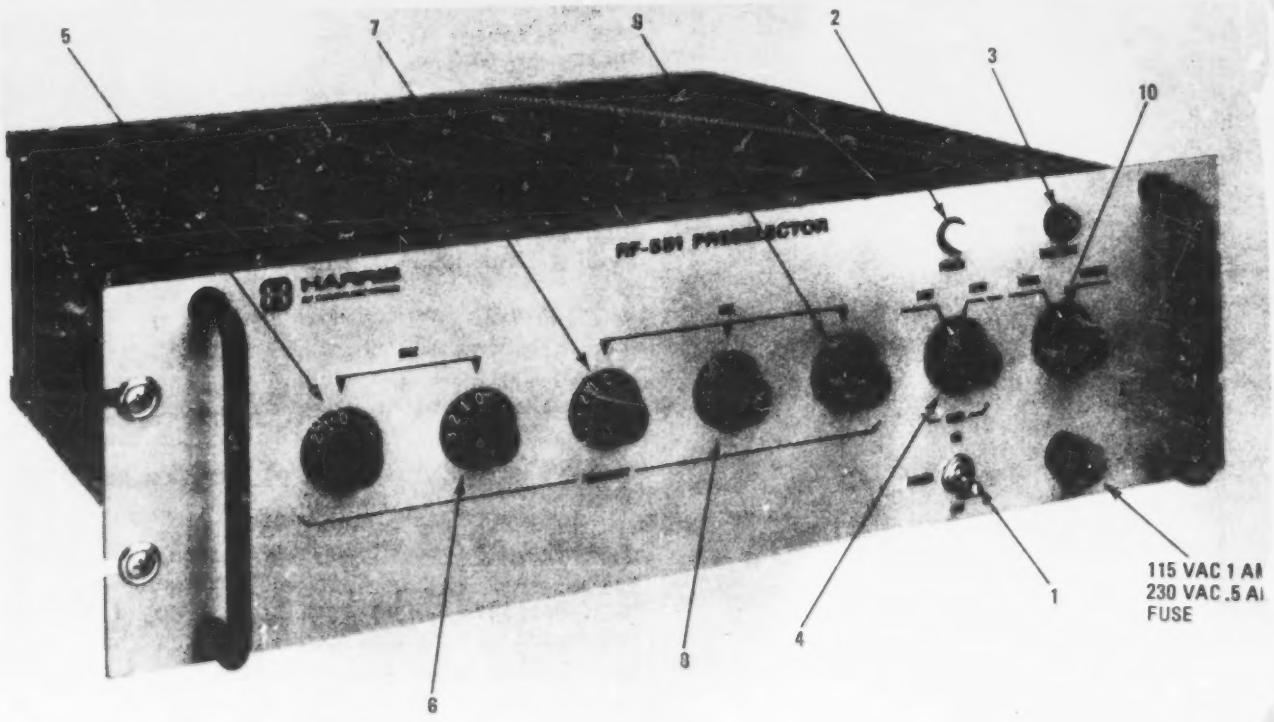


Figure 2-13. Preselector F-1520/URC, Controls and Indicators

Table 2-13. Preselector, F-1520/URC, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	POWER Switch	Turns RF-551 ON or OFF.
2	POWER Indicator	Indicator illuminates when POWER switch is ON.
3	OVERDRIVE Indicator	Indicator illuminates when an RF overload occurs.
4	GAIN Switch	When set to HIGH the RF signal is amplified; when set to LOW the RF signal is attenuated.
5	10 MHz Switch	Three-position switch selects frequency from 0 to 29.9999 MHz in 10 MHz increments.
6	1 MHz Switch	Ten-position switch selects frequency from 1 to 9 MHz in 1 MHz increments.
7	100 kHz Switch	Ten-position switch selects frequency from 0.1 to 0.9 MHz in 100 kHz increments.
8	10 kHz Switch	Ten-position switch selects frequency from .01 to 0.09 MHz in 1 kHz increments.
9	1 kHz Switch	Ten-position switch selects frequency from .001 to 0.009 MHz in 1 kHz increments.
10	LOCAL/REMOTE Switch	Two-position switch selects either the LOCAL or REMOTE operating mode. For normal Radio Set operation this switch is placed in the REMOTE position and Preselector tuning is controlled by the Receiver/Transmitter. When in the REMOTE position, the MHz and kHz controls are disabled and Preselector gain is HIGH.

b. Receiver-Transmitter Radio RT-1391(P)/URC, Controls and Indicators. Controls and indicators for the Receiver-Transmitter Radio are illustrated in figure 2-14 and listed in table 2-14.

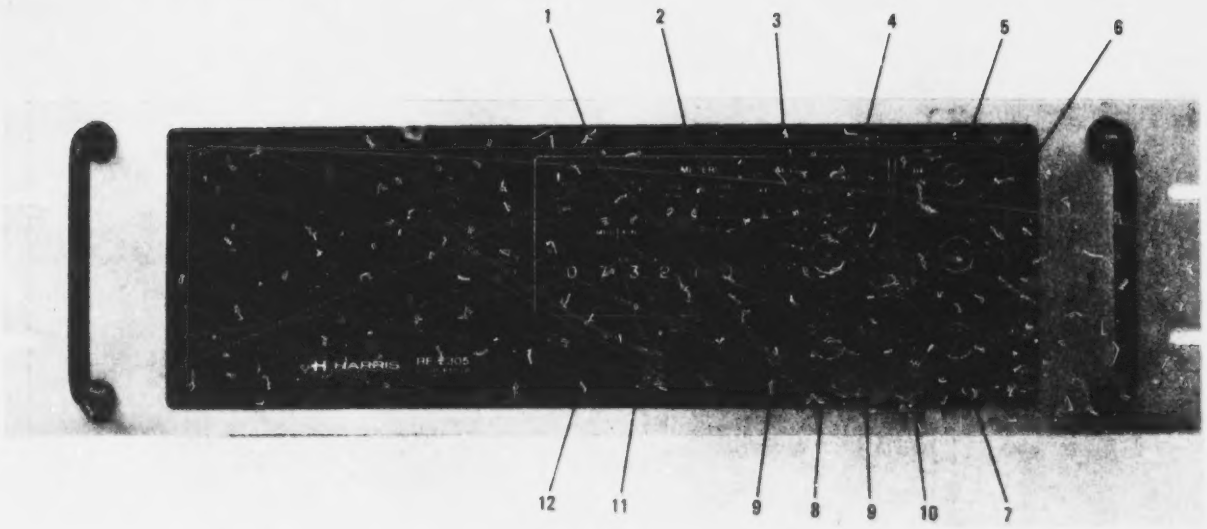


Figure 2-14. Receiver-Transmitter Radio RT-1391(P)/URC, Controls and Indicators

Table 2-14. Receiver-Transmitter Radio RT-1391(P)/URC, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	Tuning Meter	Indicates either the audio line level in dBm, or RF signal strength in "S" units.
2	METER Switch	Two-position toggle switch selects either the Line Level or Signal Strength input to the Tuning Meter.
3	AGC Switch*	Three-position toggle switch selects either fast or slow automatic gain control, or AGC OFF.
4	POWER ON Indicator	Illuminates when power is applied to the unit.
5	RF GAIN Control*	Controls AGC level to IF circuits. Normally this control is placed in the fully clockwise position. This control is disabled for transmit or remote control operation.

*Disabled in Remote.

Table 2-14. Receiver-Transmitter Radio RT-1391(P)/URC, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
6	SQUELCH Control	Provides manual adjustment of the squelch threshold level. To set this control, position it fully clockwise, and after audio level has dropped to indicate squelch activation, slowly rotate the control counterclockwise until the audio returns. With a no-signal condition, a slight clockwise rotation should activate squelch and ensure a maximum sensitivity condition. An incoming signal that exceeds this no-signal threshold will "break" the squelch for normal communication. When the signal disappears for about 5 seconds, the squelch circuit will again disable the speaker audio for "quiet" operation.
7	VOLUME Control	Adjusts audio output level to speaker or to headphones (if used). This control is also mechanically coupled to the POWER ON/OFF switch. Positioning to the extreme counterclockwise position removes all primary power. Displacing the control clockwise to effect volume adjustment automatically selects POWER ON.
8	FINE TUNE (Clarifier) Control*	If a distant transmitting station operating on-channel is slightly off-frequency, the received signal will not sound "natural". The ±240 Hz range of the receive-only clarifier can be used to fine-tune these signals for optimum clarity. The receiver-transmitter uses a unique frequency stepping technique to cover this ±240 Hz range. Displacing the spring-loaded control clockwise or counterclockwise will "step" the frequency up or down in 15 Hz steps. Releasing the control (to its rest position) stops the stepping action and maintains the selected "tune" condition. Powering the unit up, or changing channels will automatically reset the clarifier to zero (both HI and LO lights off).
9	FINE TUNE LO, HI Indicators	Lights to indicate that the FINE TUNE control has adjusted the frequency lower or higher.

*Disabled in Remote.

Table 2-14. Receiver-Transmitter Radio RT-1391(P)/URC, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
10	Mode Switch*	This control is used to select the desired operating mode during local operation. When the transceiver is being controlled remotely, this switch is disabled.
11	MHz/kHz Switches & Display*	Six pair of pushbutton switches permit the operator to select the desired operating frequency. Pressing the + pushbuttons will increase the frequency while pressing the - pushbuttons will decrease the frequency. The selected frequency digits are shown in the display windows.
12	Channel Switches*	When the receiver-transmitter is equipped with the channel storage option, the channel switches are the switches normally used for 1 kHz and 100 Hz frequency information. To operate in the channel mode, the 10 MHz, 1 MHz, 100 kHz, and 10 kHz switches should be dialed to "0". This will activate the channel mode of operation.

*Disabled in Remote.

c. Processor-Interface Unit CP-1479/URC, Controls and Indicators. Controls and indicators for the Processor-Interface Unit are illustrated in figure 2-15 and listed in table 2-15.

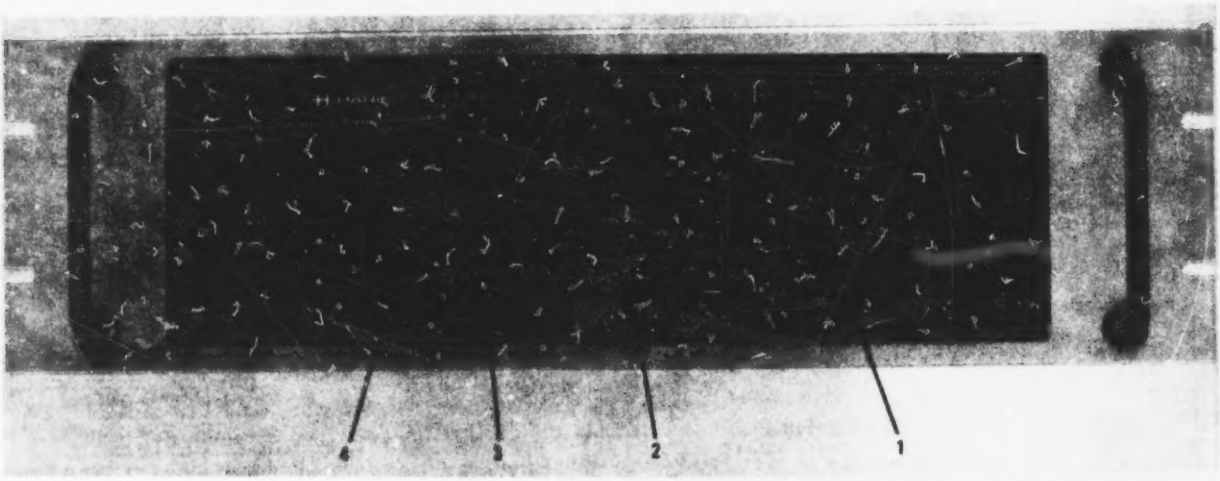


Figure 2-15. Processor-Interface Unit CP-1479/URC, Controls and Indicators

Table 2-15. Processor-Interface Unit CP-1479/URC, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	PA STATUS Switch and Indicators	Three-position toggle switch is used to select the operating mode of the AM-7127/URC RF Amplifier as follows: PA OFF - In this position, only 115 Vac primary power is supplied from the AM-7127/URC to the unit. STANDBY - Turns on the blower in the AM-7127/URC and applies filament voltage to the power tubes. OPERATE - Applies high voltage to the AM-7127/URC. The PA OFF, STANDBY, and OPERATE indicators illuminate to show the selected switch position.
2	LOCAL/REMOTE CONTROL Switch and Indicators	Two-position toggle switch selects either LOCAL or REMOTE control of the Radio Set. The appropriate indicator illuminates to show the selected control mode. NOTE The remote control mode cannot be engaged (as confirmed by illumination of REMOTE LED) unless the unit is equipped with the optional LCU PW boards and the unit is properly interfaced with the remote control device.
3	KEYLINE Indicator	Illuminates when the Receiver-Transmitter and RF Amplifier are keyed.
4	FAULT Indicator	Illuminates when a fault exists in the transmit signal path or synthesizer of the Radio Set.

d. Radio Frequency Amplifier AM-7127/URC, Controls and Indicators. Controls and indicators for the RF Amplifier are illustrated in figure 2-16 and listed in table 2-16.

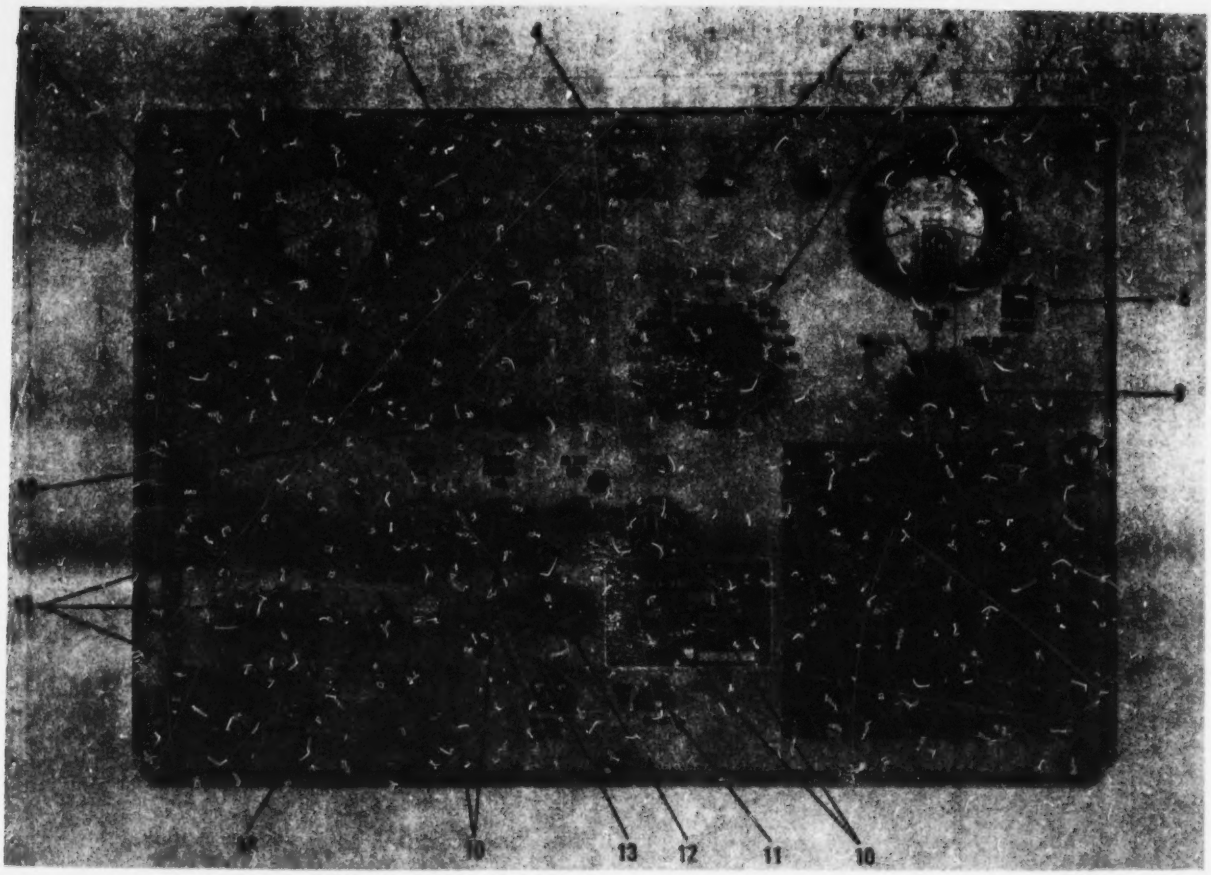


Figure 2-16. Radio Frequency Amplifier AM-7127/URC, Controls and Indicators

Table 2-16. Radio Frequency Amplifier AM-7127/URC, Controls and Indicators

Reference Designator	Control or Indicator	Function
1	Multimeter Switch	Selects the final and driver amplifier parameters to be monitored with the multipurpose meter:
	DRIVER 2 AMPERES	Cathode current of driver amplifier tube V2.
	DRIVER 1 AMPERES	Cathode current of driver amplifier tube V1.
	PA PLATE 2 AMPERES	Cathode current of final amplifier tube V2.
	PA PLATE 1 AMPERES	Cathode current of final amplifier tube V1.

Table 2-16. Radio Frequency Amplifier AM-7127/URC, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
	INPUT PWR 0-150 MW	RF level applied to input of driver amplifier.
	PA PLATE VOLTS	Dc voltage applied to plates of final amplifier tubes V1 and V2.
	DRIVER PLATE VOLTS	Dc voltage applied to plates of driver amplifier tubes V1 and V2.
	PA-DRIVER SCRNS VOLTS	Dc voltage at the 285 volt point on the final/driver screen voltage supply.
2	Multimeter	Provides indications of voltage, current, and RF input power as selected with the Multimeter switch.
3	OVERLOAD Indicator	Lights to provide a visual indication when an overload occurs.
4	POWER Indicator	Lights when primary power is supplied to RF-110A and PRIMARY POWER switch is ON.
5	HIGH VOLTAGE Indicator	Lights when high voltage is applied to plate circuits.
6	FREQUENCY MHZ Selector Switch	When set at AUTOMATIC, an external five-wire code can be used to automatically tune the unit to the selected band. When set at any one of the other nineteen positions, a five-wire code is internally generated to automatically tune the unit to the selected band.
7	Power Meter	Provides an indication of forward or reflected output power in the ranges selected with the Power Meter switch.
8	Elapsed Time Meter	Indicates total elapsed time in hours that equipment is energized.
9	Power Meter Switch	Selects range of forward or reflected power to be measured with Power Meter.

Table 2-16. Radio Frequency Amplifier AM-7127/URC, Controls and Indicators (Continued)

Reference Designator	Control or Indicator	Function
10	Fuses (4) with indicators	Four indicators are provided to protect the following power circuits: BLOWER, 1.0A - 115V, 400 Hz EXCITER COUPLER, 3.0A - 115V, 60 Hz 28 Vdc, 3.0A 500 Vdc, 1.5A The appropriate indicator lights if fuse opens.
11	Key Switch	Determines method by which unit is keyed.
	NORMAL	Keying of unit is accomplished from Exciter.
	TUNE KEY (spring-loaded)	Unit is keyed; a command signal is generated for exciter to produce a low power carrier for tuning purposes.
	LOCAL KEY	Unit is keyed.
12	PWR Control	Permits RF power output to be varied without disturbing APC and PPC adjustments. Normally set maximum clockwise.
13	PA BIAS control	Permits bias voltage to final amplifier tubes V1 and V2 to be adjusted.
14	PRIMARY POWER Switch	When set to ON position, primary power is supplied to the control circuits in the unit and PP-5237/UR.
15	Primary power fuses (3) with indicators*	Provides overload protection for each phase of primary power input. If the fuse in any line opens, the associated indicator lights.
16	OVERLOAD Switch	Determines condition of overload circuit.
	NORMAL	Overload circuit is in normal condition.
	RESET (spring-loaded)	Resets overload circuit.

*As currently configured, the primary input power to the RF Amplifier is single phase, 230 Vac. If overload conditions occur, one or both of the upper two fuses, F1 and F2, will light. The bottom fuse F3, is not active and will not light in an overload condition.

e. Power Supply PP-5237/UR, Operating Indicators. Operating indicators for the Power Supply are illustrated in figure 2-17 and listed in table 2-17.

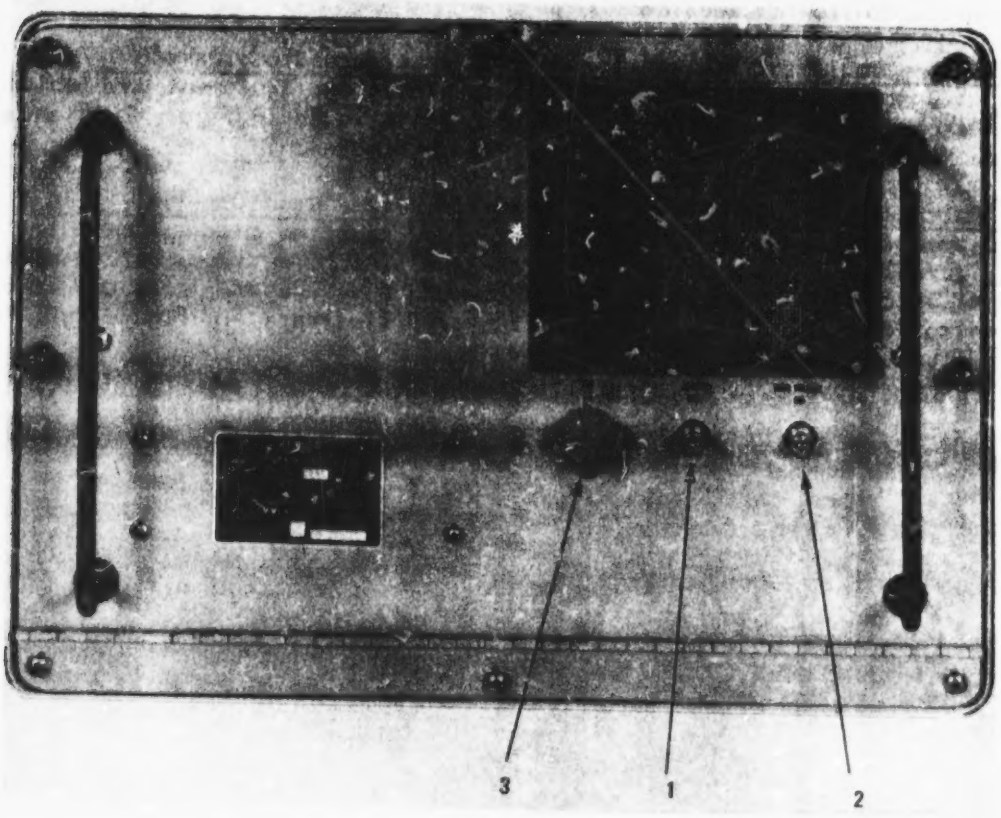


Figure 2-17. Power Supply PP-5237/UR, Operating Indicators

Table 2-17. Power Supply PP-5237/UR, Operating Indicators

Reference Designator	Control or Indicator	Function
1	POWER ON	Indicator illuminates when the unit's fan inverter is energized, when the Radio Set is in STDBY or OPERATE mode.
2	HIGH VOLTAGE ON	Indicator illuminates when 230 Vac power is applied to the unit.
3	24V, 8A Fuse and Indicator	Protects the power supply circuits. Fuse indicator illuminates when fuse is open.

2-3. CONTROL INTERFACE GROUP OK-449(V)/FRC-176(V), CONTROLS AND INDICATORS

Controls and indicators for the equipment racks in the Control Interface Group are described in the following sections.

a. Telephone Equipment Bay, Unit 1 Control Interface Group OK-449(V)/FRC-176(V). Operator controlled devices in the Telephone Equipment Bay include Dc and Audio Patch Panels. Dc Patch Panel 1A6 is illustrated in figure 2-18 and Audio Patch Panels 1A7 and 1A8 are illustrated in figure 2-19.

b. RF Patch Equipment Bay, Unit 2 Control Interface Group OK-449(V)/FRC-176(V) The RF Equipment Bay consists of the RF Patch Panel and the Antenna Control/Indicators. Figure 2-20 illustrates an RF Patch Panel 2A1. The number of transceiver and antennas which an RF Patch Panel can accommodate varies from site to site. Th Antenna Control/Indicator Panels 2A2 thru 2A5 are illustrated in figure 2-21 while table 2-18 lists the controls and indicators.

P/O CONTROL INTERFACE GROUP
DC PATCH 1A6

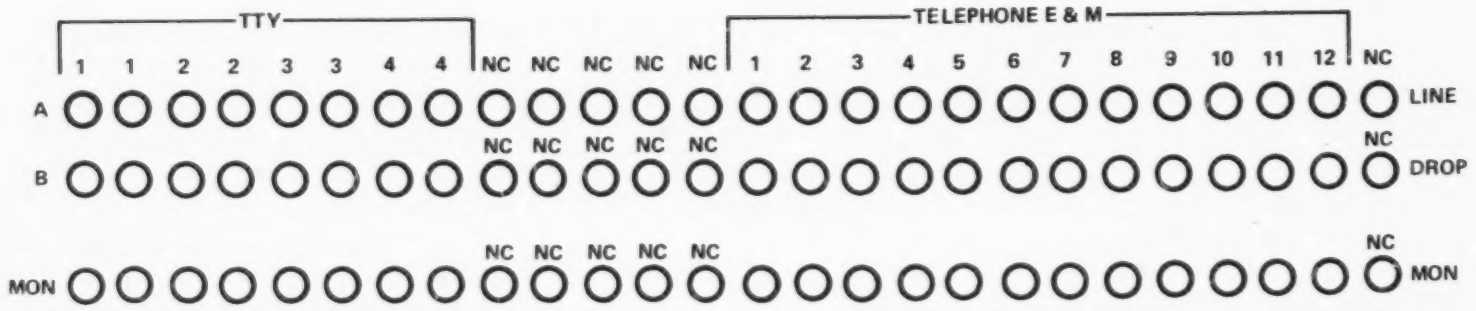
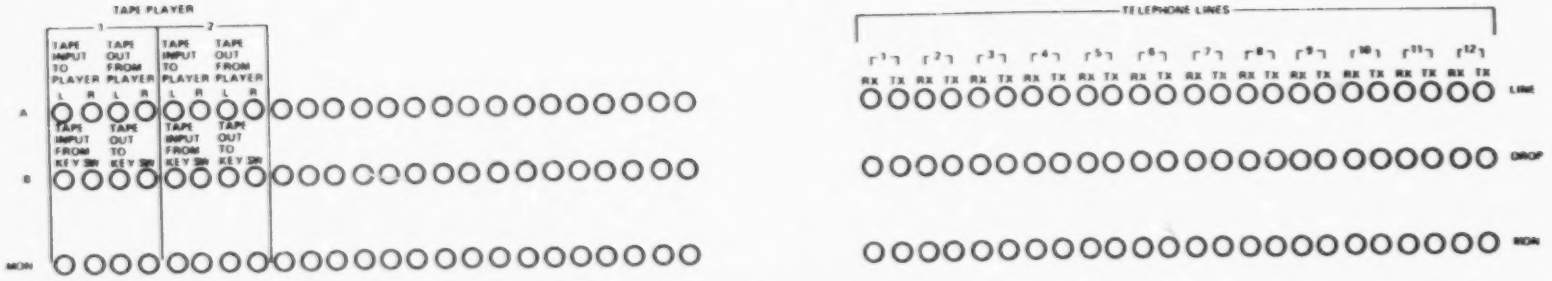


Figure 2-18. DC Patch Panel, 1A6 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators

TM 11-5895-1137-10
T.O. 31R5-2FRC-176-1

P/O CONTROL INTERFACE GROUP

AUDIO PATCH 1A7



AUDIO PATCH 1A8

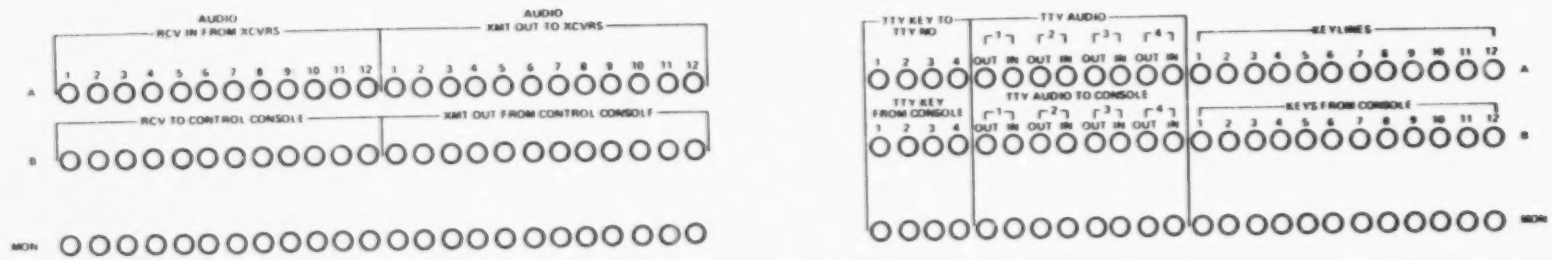


Figure 2-19. Audio Patch Panels, 1A7 and 1A8 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators

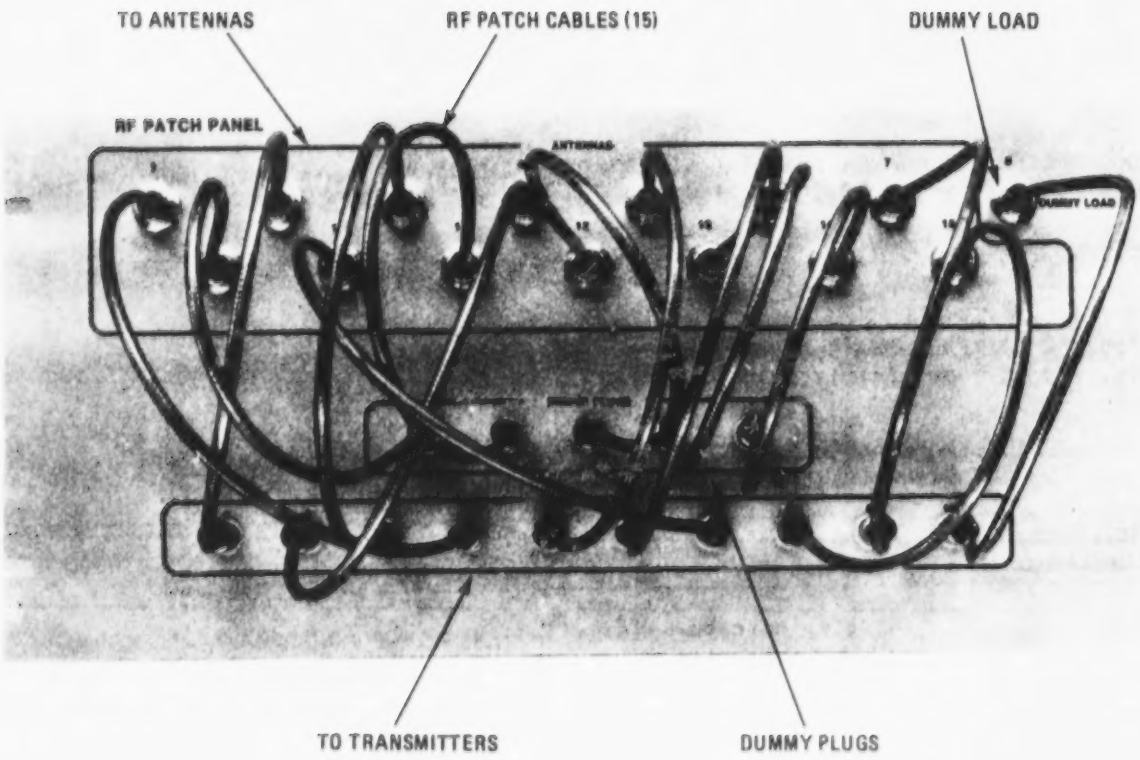


Figure 2-20. RF Patch Panel, 2A1 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators

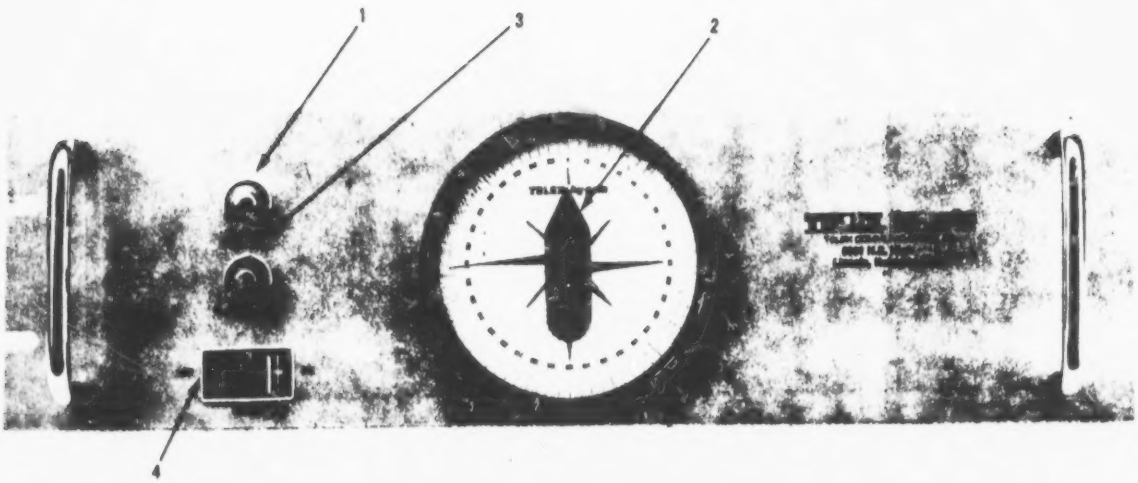


Figure 2-21. Antenna Control/Indicator, 2A2 thru 2A5 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators

Table 2-18. Antenna Control/Indicator, 2A2 thru 2A5 Control Interface Group OK-449(V)/FRC-176(V), Controls and Indicators

Reference Designator	Control or Indicator	Function
1	Rotate Indicator	Illuminated when antenna is rotating. When antenna stops rotating, indicator light goes out, showing that antenna has reached desired direction.
2	Rotary Control Switch	Controls movement and direction of antenna. Switch is turned in 30° increments.
3	Power Indicator	When illuminated, indicates that dc voltage has been applied to unit.
4	POWER ON/OFF Switch	Controls ac power input to the unit.

Section II. OPERATING PROCEDURES

2-4. GENERAL

This section contains starting, normal operating, and stopping procedures for the Radio Communications System. The system operating procedures cover the Communication Control Console, Radio Set, and Control Interface Group.

2-5. RADIO SET AN/URC-103(V)1 INITIAL TURN-ON

The Radio Set is placed in the operating mode using the following procedures.

a. Pre-Turn-On Switches and Selector Positions. Place the Radio Set equipment switches and selectors in the positions described in the procedure of table 2-19. Operating controls not listed in this table may be placed initially in any desired position.

NOTE

The LOCAL/REMOTE control switch on the Processor-Interface Unit is placed in the LOCAL position during initial turn-on. Following the Communication Control Console initial turn-on procedure, the switch should be set to the REMOTE position.

b. Power Source Connection. Verify that a 230 Vac (±10%), 50/60 Hz Single Phase power source has been connected to the Radio Set.

c. Turn-On Procedure. Place the Radio Set equipment switches and selectors in the positions described in the procedure of table 2-20. The procedures therein should be performed in the sequence given. The Radio Set will be ready for normal operation at the completion of the procedures.

Table 2-19. Radio Set AN/URC-103(V)1 Standard Pre-Turn-On Switch and Selector Position Setup Procedure

Switch or Selector	Place Switch or Selector To or At
Receiver-Transmitter Radio RT-1391(P)/URC	
Meter Switch	LINE LVL or SIG STR position
AGC Switch	SLOW (middle) position
RF GAIN Control	Maximum clockwise position
SQUELCH Control	OFF position
VOLUME Control	OFF position

Table 2-19. Radio Set AN/URC-103(V)1 Standard Pre-Turn-On Switch and Selector Position Setup Procedure (Continued)

Switch or Selector	Place Switch or Selector To or At
FINE TUNE Control	Midrange (between LO and HI) position
MODE Switch	Desired mode of operation
MHz/kHz Switches	Desired frequency
Processor-Interface Unit CP-1479/URC	
PA STATUS Switch	PA OFF position
LOCAL/REMOTE CONTROL Switch	LOCAL position
Radio Frequency Amplifier AM-7127/URC	
PRIMARY POWER Switch	OFF (down) position
OVERLOAD Switch	NORMAL position
FREQUENCY MHz Selector	AUTOMATIC position
Multimeter Switch	INPUT PWR 0-150 mW position
Power Meter Switch	FWD PWR 0-1500 position
Key Switch	NORMAL position
PA BIAS Control	(Do not adjust)
PWR Control	Maximum clockwise position
Power Supply PP-5237/UR	
NOTE: There are no switches or selectors on the front panel of this unit.	
Preselector F-1520/URC	
POWER Switch	OFF position
GAIN Switch	HIGH position

Table 2-19. Radio Set AN/URC-103(V)1 Standard Pre-Turn-On Switch and Selector Position Setup Procedure (Continued)

Switch or Selector	Place Switch or Selector To or At
LOCAL/REMOTE Switch	REMOTE position
10 MHz, 1 MHz, 100 kHz, 10 kHz, and 1 kHz Selectors	Desired frequency (No effect in REMOTE position)
Radio Frequency Switching Unit SA-2347/URC	
NOTE: There are no switches or selectors on this unit.	

Table 2-20. Radio Set AN/URC-103(V)1 Standard Turn-On Procedure

Seq. No.	Radio Set Equipment	Place Switch Or Selector	To	Observation/Indication
1	Receiver-Transmitter Radio RT-1391(P)/URC	VOLUME Control	ON and rotate 1/4 turn clockwise	a. The POWER ON indicator will come on and an audible background noise will be heard from the unit's speaker. b. The Neon POWER light will come on.
2	Radio Frequency Amplifier AM-7127/URC	PRIMARY POWER Switch	ON	a. The Neon POWER light will come on. b. On the Processor-Interface Unit, the PA OFF indicator will come on.
3	Preselector F-1520/URC	POWER Switch	ON	The POWER indicator will come on.
4	Processor-Interface Unit CP-1479/URC	PA STATUS Switch	STANDBY	a. The STANDBY indicator will come on. b. On the Power Supply, the POWER ON indicator will come on. c. The Power Supply fan will come on. ⚠1
5	Processor-Interface Unit CP-1479/URC	PA STATUS Switch ⚠2	OPERATE	a. The OPERATE indicator will come on. b. On the Radio Frequency Amplifier, the HIGH VOLTAGE indicator will come on. c. On the Power Supply, the HIGH VOLTAGE ON indicator will come on.

⚠1 The 3-minute warmup period starts when the PA STATUS Switch is placed to STANDBY position.

⚠2 The OPERATE position of the PA STATUS switch will have no effect until the Radio Frequency Amplifier's 3-minute warmup period.

Table 2-20. Radio Set AN/URC-103(V)1 Standard Turn-On Procedure (Continued)

Seq. No.	Radio Set Equipment	Place Switch Or Selector	To	Observation/Indication
6	Radio Frequency Amplifier AM-7127/URC	Multimeter Switch	a. PA PLATE position b. DRIVER PLATE c. PA DRIVE SCRNS	a. The power amplifier plate voltage indicated should be +2250 Vdc ± 225 Vdc. (3) b. The driver plate voltage indicated should be +500 Vdc +100 Vdc/-50 Vdc. c. The driver screen voltage indicated should be +200 Vdc ±50 Vdc.
7	Processor Interface Unit CP-1479/URC	LOCAL/REMOTE Switch	REMOTE	Control can now be effected from the Remote Control Unit.

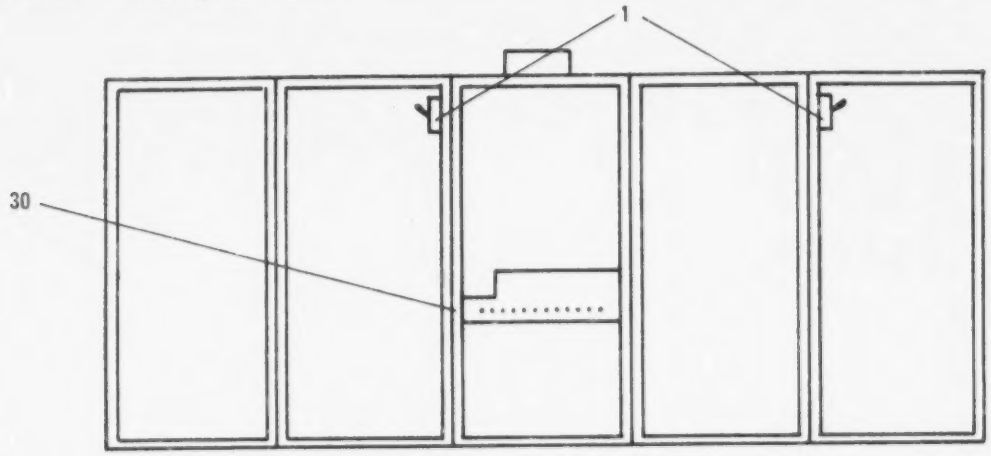
(3) This indication is predicated on the use of a 230 Vac input voltage.

CAUTION

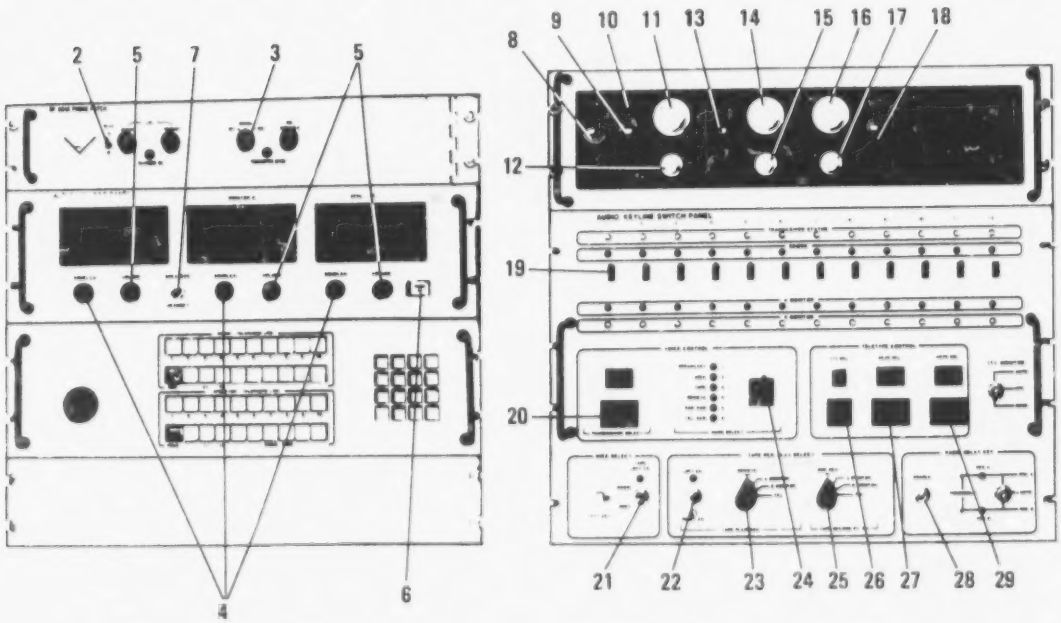
Do not operate transmitter for prolonged periods when reflected power exceeds 250 watts (at 1000 watts forward power). This indicates serious antenna mismatch problem that should be solved for safe long-term operation.

2-6. COMMUNICATION CONTROL CONSOLE OJ-512/FRC-176(V) Initial Turn-On

The Communication Control Console is placed in the operating mode according to the settings illustrated in figure 2-22 and the procedure outlined in table 2-21. The initial turn-on and operating procedure for the Remote Control-Monitor C-11021/URC is covered in paragraph 2-9.



CONTROL CONSOLE-REAR



NOTES:

1. FIGURE IS KEYED TO TABLE 2-20.
2. B OPERATOR INITIAL TURN ON CONTROL SETTINGS ARE IDENTICAL TO A OPERATOR INITIAL TURN ON CONTROL SETTINGS.

Figure 2-22. Communication Control Console Initial Turn-On Control Settings

Table 2-21. Control Console Turn-On Procedure

Ref. Desig.	Action
1	Set AC Power Switches to ON
2	Set METER Switch to +10
3	Set Function Switch to VOX
4	Rotate SQUELCH Controls to maximum CCW
5	Adjust VOLUME Controls to midway position
6	Set POWER Switch to ON
7	Select SPEAKER position
8	Set POWER Switch to ON
9	Set MONITOR Switch to INPUT
10	Depress 15/16 IN/SEC Switch
11	Adjust VOLUME Control to "0" position
12	Select STEREO on Monitor Mode
13	Set REC-L Switch to ON
14	Rotate left INPUT LEVEL to "7"
15	Select AUX on Input Selector
16	Rotate right INPUT LEVEL to "7"
17	Select AUX on Input Selector
18	Set REC-R Switch to ON
19	Set all Radio Set (Transceivers) SEIZE Switch to maximum up
20	Select "00" on TRANSCEIVER SELECT
21	Select BOOM on Microphone Select Switch
22	Set Channel Select switch to RIGHT CH.
23	Select REMOTE on TAPE RCD/PLAY SELECT
24	Set Mode Select Switch to "0"
25	Select SND/RCV on Tape Record RT. CH selector

Table 2-21. Control Console Turn-On Procedure (Continued)

Ref. Desig.	Action
26	Set TTY SEL to "0"
27	Set RCVR SEL to "00"
28	Set ENABLE switch to OFF (down position)
29	Set XMTR SEL to "00"
30	Set Radio Set Assignment Switches

2-7. REMOTE CONTROL-MONITOR C-11021/URC INITIAL STARTUP AND OPERATING PROCEDURE

a. Turn-On Procedure. If the RCU is being turned on for the first time, check the ac source switch A1A1S1 on the rear panel of the unit to ensure that the switch setting matches the voltage source. Then proceed as follows:

(1) Turn on RCU power by turning front panel VOLUME control clockwise out of detent.

(2) The RCU will do the RCU Self-Test Routine at this time. All LEDs will be illuminated and all seven-segment displays will display an eight "8". If the test is passed, the following LEDs will be lit:

MODE - USB

STATUS - OFF

AGC - FAST

(3) The RCU will poll the first Radio Set and the TRANSCEIVER display will show "0 1". The FREQUENCY display will show "000000".

(4) After ten seconds if there is no communication between the RCU and the LCU "HELP" will appear in the FREQUENCY display.

(5) If on initial power up, the RCU does not pass the Self-Test Routine, a message will appear in the FREQUENCY display.

b. Display Code Interpretation. Table 2-22 lists all of the RCU display codes, which are presented on the RCU FREQUENCY display, and gives the interpretation of each.

Table 2-22. RCU Display Code Interpretation

Display Code	Interpretation
RCU-01	RCU PROM check-sum check failed.
RCU-02	RCU RAM read/write check failed.
RCU-03	RCU UART loopback check failed.
RCU PAS	RCU passed all Self-Test checks.
LCU-01	LCU PROM check-sum check failed.
LCU-02	LCU RAM read/write check failed.
RCU PAS	LCU passed all Self-Test checks.
FAU-01	Fault in the selected XCVR exciter.
FAU-02	Fault in the TRANSCEIVER readback to the LCU.
Err-01	Request for invalid channel number.
Err-02	Request for frequency outside of frequency range.
Err-03	Request for invalid MODE.
Err-04	Request for invalid AGC Mode.
Err-05	Command sent to LCU was not initiated because the TRANSCEIVER is in LOCAL Mode.
bad	Means the RCU operator had made an invalid RCU key pad entry.
HELP	Means there is a communications error between the RCU and LCU. The LCU has not responded in the last eight (8)seconds.
SOrry	CHANNEL option selected when CHANNEL option is not available.
LOCAL	Displayed in response to attempting to change equipment configuration, using the RF-7401 front panel, when the transceiver is in LOCAL.

c. Normal Operation. When the RCU is turned on by the front panel VOLUME control, it does a self-test of its circuitry. All of the front panel LEDs are lit as a check of the LEDs and their drive circuits. The internal RAM is completely checked; the CPU writes to the RAM and then reads what it wrote and does a comparison. The EPROMs are checked by a CHECKSUM test. The UART is given a loopback test. If any of these tests fail, a message code is displayed on the front panel FREQUENCY display, and the unit may not be functional. If the unit passes all of the tests,

it will poll Radio Set Number 1. The TRANSCEIVER display will read 0 1 and the FREQUENCY display will read 000000. The MODE display will indicate USB, the STATUS display will indicate OFF, and the AGC display will indicate FAST. If TRANSCEIVER 01 is in the system, the RCU's displays will then show the current status of that Radio Set.

d. Radio Set Change Procedure. To change the Radio Set being controlled, the procedure below should be followed:

(1) Press TRANSCEIVER key. The CURSOR appears in the left-most digit of the TRANSCEIVER display field.

(2) Press two numerical keys (0-9) corresponding to the desired Radio Set number. After pressing the first key, the digit will appear in the left-hand TRANSCEIVER display. If the operator continues to enter digits, the digit in the right-hand TRANSCEIVER display will be lost, so that the display shows the last two digits entered.

(3) When the TRANSCEIVER display field shows the desired Radio Set number, press the ENTER key. At this point the Remote Control-Monitor Unit will poll the selected Radio Set and the RCU front panel displays will show its current status.

e. Frequency Change Procedure. To change the frequency of a Radio Set, proceed as follows:

(1) Press the FREQUENCY key. The left-most FREQUENCY display digit will commence blinking off and on, indicating the position of the CURSOR.

(2) Enter new frequency by pressing combination of six numerical keys. This will change the FREQUENCY display digits while stepping the CURSOR from left to right.

(3) If an invalid key is pressed, an error code will be displayed in the FREQUENCY display and the operator will have to re-enter the frequency.

(4) To change individual digits in the frequency, press CURSOR key. CURSOR moves one display segment to the right for each time the CURSOR key is pressed (the CURSOR may be moved to the left-most display digit by pressing the FREQUENCY key).

(5) When digit to be changed is reached by CURSOR, press proper numerical key. New digit will appear in FREQUENCY display.

(6) After all FREQUENCY digit changes have been made, press ENTER key to change the frequency of the displayed transceiver. If the LCU does not receive the message correctly, or does not reply to the message, an error code will be displayed. If the operator enters a frequency of 30 MHz or above (an invalid frequency), "BAD" will be displayed in the FREQUENCY display. If the operator enters a frequency below 2 MHz, the Radio Set will automatically go to STANDBY.

f. Mode Change Procedure. To change the MODE of the transceiver, proceed as follows:

(1) Press the MODE key. Each time the MODE key is pressed, the MODE display changes to the next mode in the series USB, LSB, AM, CW, AFSK, and then back to USB.

(2) After selecting the desired mode, press ENTER key to send new mode to selected transceiver. An error code will be displayed if the transceiver does not respond to the message.

g. Status Change Procedure. To change the status of a Radio Set, proceed as follows:

(1) Bringing Radio Set to OPERATE condition from OFF condition.

(a) Press STATUS key. The display will change to STANDBY the next status in the series.

(b) Press ENTER key to send STANDBY status to Radio Set.

(c) Press STATUS key. The display will change to OPERATE, the next status in the series.

(d) Press ENTER key to send OPERATE status to Radio Set. OPERATE indicator will blink on and off.

(e) Press ENTER key. Blinking OPERATE indicator will go out and STANDBY indicator will come on. After a period of about 3-1/2 minutes (the Amplifier warm-up period), STANDBY indicator will go out and OPERATE indicator will come on. The Radio Set is ready for operation.

(2) Shutting Radio Set down.

(a) Press STATUS key. Display will change to STANDBY.

(b) Press ENTER key to signal STANDBY status to Radio Set.

(c) Press STATUS key. Display will change to OFF.

(d) Press ENTER key to send OFF status to Radio Set. The Radio Set is now in the OFF condition.

h. AGC Change Procedure. To change the AGC of the Radio Set, proceed as follows:

(1) Press AGC key. The display shifts back and forth between FAST and SLOW each time the AGC key is pressed.

(2) After AGC function is selected, press ENTER to send AGC function to Radio Set. Normally SLOW AGC is selected for voice and CW operation while FAST is used for data (FSK) transmissions.

i. Fine Tune Control. The FINE TUNE control is a two-way momentary switch. When the switch is moved to the right (toward the HI LED), the fine tuning increases from the nominal frequency of the selected Radio Set. When it is moved to the left (toward the LO LED), the fine tuning decreases from the nominal frequency of the selected Radio Set. The LO and HI LEDs show whether the current fine tune position is below or above the nominal frequency of the selected Radio Set. If the fine tune is at the nominal frequency, neither LO nor HI LED is lit. Table 2-23 lists Mode versus Fine Tune Indicator data on the Radio Set.

Table 2-23. Radio Set Mode Versus Fine Tune Indicator Data

MODE Switch Position	FINE TUNE Control Position	LO Indicator Status	HI Indicator Status	Tone Pitch
USB	LO	On	Off	High
USB	HI	Off	On	Low
LSB	LO	On	Off	Low
LSB	HI	Off	On	High
AM	--	(1)	(1)	----

(1) The indicator lights change in response to the FINE TUNE control changes but do not affect the audio.

NOTE: The FINE TUNE control has a range of approximately ±250 Hz in 15 Hz increments and decrements about the selected frequency. The control is reset each time a frequency or channel change occurs.

2-8. CONTROL INTERFACE GROUP OK-449(V)/FRC-176(V) INITIAL TURN-ON

The Control Interface Group is placed in the operating mode by placing AC power switch in Telephone Equipment Bay to ON position as illustrated in figure 2-23.

2-9. SYSTEM OPERATING CHECKS

The system operating checks listed in table 2-24 should be performed after initial turn-on and after each operator change of shift. If malfunctions are detected, refer to system maintenance personnel.

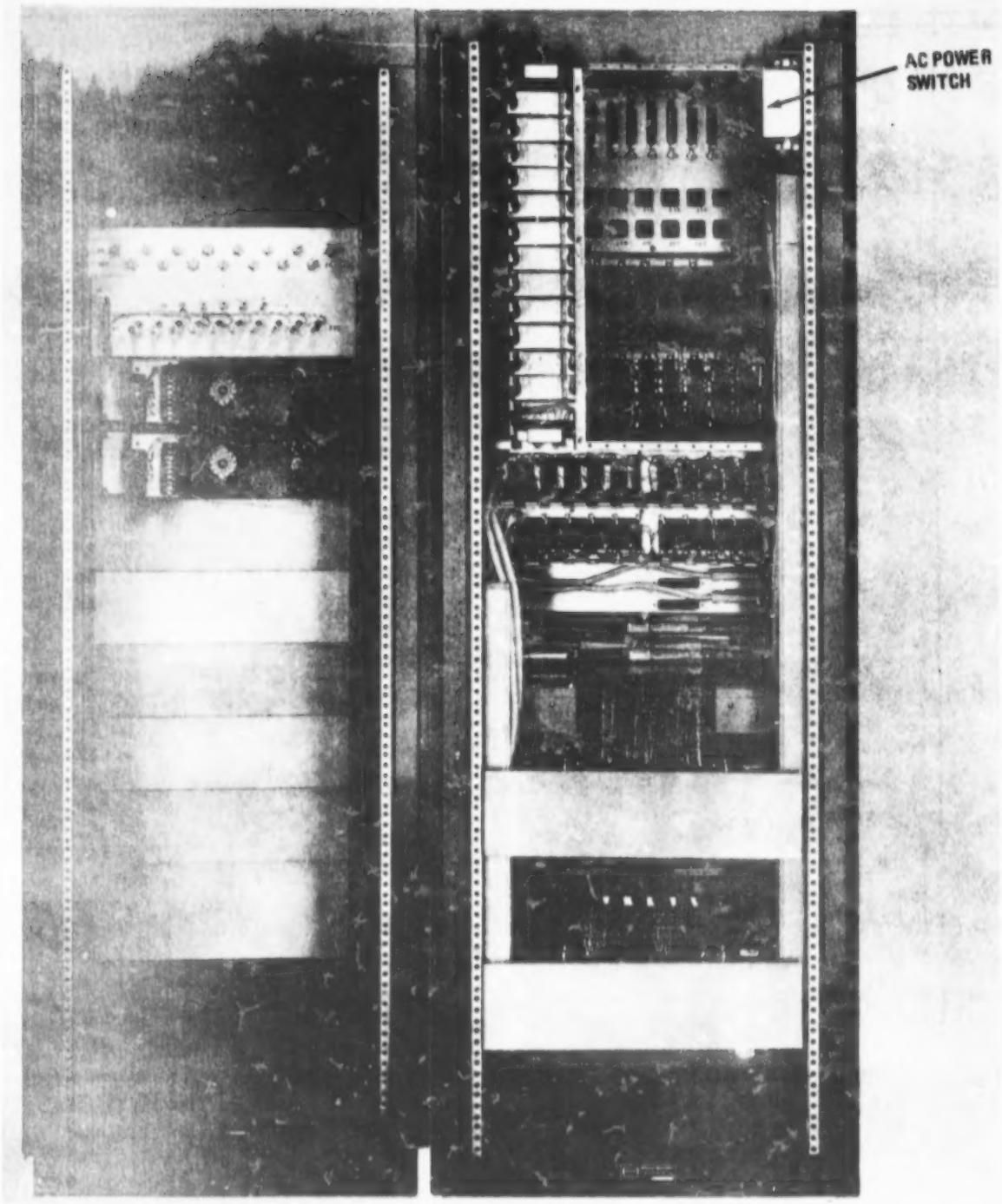


Figure 2-23. Control Interface Group OK-449(V)/FRC-176(V) Rear View

Table 2-24. System Operating Checks

Item	Item To Be Checked	Procedure
1	Telephone dial tone	Depress each active trunk line button on the Operator-Telephone Line section of the Telephone Switch/Dial Panel. Using Handset, listen for dial tone on each of trunk lines selected.
2	Telephone bell (SONALERT)	Request outside party to place call to console operators. Listen for telephone SONALERT operation.
3	Handset audio	Depress RADIO button on Telephone Switch/ Dial Panel. Select active transmitter and set SEIZE switch on Audio/Keyline Switch Panel to SEIZE position. Send and receive audio should be hard on the telephone handset and from the SEND/ RECEIVE speaker on the Audio Monitor Panel.
4	MONITOR A Audio	Place Radio Set SEIZE switch on Audio/ Keyline Switch Panel to MONITOR A position. Receive audio from Radio Set should be heard on MONITOR A speaker of Audio Monitor Panel.
5	MONITOR B Audio	Place Radio Set SEIZE switch on Audio/ Keyline Switch Panel to MONITOR B position. Receive audio from Radio Set should be heard on MONITOR B speaker of Audio Monitor Panel.
6	Boom Microphone	Set Microphone Select switch on Audio/ Keyline Switch Panel to BOOM. Set selected Radio Set SEIZE switch to SEIZED position. Set Voice Control Mode Select to MIKE (position 2). Key Radio Set using footswitch or PTT KEY on panel. Establish radio contact with distant station to check 2-way voice operation.
7	Headset Microphone	Set Microphone Select switch on Audio/ Keyline Switch Panel to HEADSET. Set selected Radio Set SEIZE switch to SEIZED position. Set Voice Control Mode Select to MIKE (position 2). Key Radio Set using footswitch, PTT KEY or HEADSET PTT switch (inline). Establish radio

Table 2-24. System Operating Checks (Continued)

Item	Item To Be Checked	Procedure
7 (Cont.)		contact with distant station to check 2-way voice operation.
8	Remote Control-Monitor Unit	Press FAULT KEY on Remote Control Unit located in center console. The RCU will do a self-test of itself and the Local Control Unit (LCU located in the Radio Set). The LCL CONT (Local Control) LED lights when the Radio Set is switched to local control. The KEY LED lights when the transceiver is being keyed.
9	Status Monitor Unit Lamp and Sonalert Test	Press Lamp Test button on Status Monitor Unit. All of the operational indicators on the panel should illuminate and sonalert will activate.
10	Telephone Switch/Dial Lamp Test	Press BANK 1 switch to check indicator bulbs in upper two rows of trunk select switches. Press BANK 2 switch to check indicator bulbs in lower two rows of trunk select switches.
11	RF Patch Panel (Control Interface Group)	Verify that Radio Sets are connected to assigned antennas in accordance with operational requirements. Make sure that antenna patch connectors are properly seated.

2-10. SYSTEM OPERATING MODES

The following paragraphs outline normal operation of the Communication Control Console. The initial start-up procedures for all of the equipment in the system should be complete prior to operation. The description covers the various modes of operation available to the console operator.

a. Broadcast Mode. In this mode, the receive audio from a selected transceiver is routed to one or more transceivers in the system for rebroadcast. For example, the receive audio from Transceiver 1 is to be routed to Transceivers 2 and 3. Controls should be set as follows:

(1) Set Mode Select switch to position 1 (BROADCAST).

(2) Set TRANSCEIVER SELECT Switch to 1. Readout should show 1. The BROADCAST LED indicator should come on. Transceiver 1 is inhibited from transmitting and only functions as a receiver.

(3) Set Transceiver SEIZE switches 2 and 3 to SEIZED position. The red LEDs for Transceivers 2 and 3 should come on.

(4) To key the transceiver, use the footswitch or the push-to-talk button on the Mike Select block.

b. Microphone Mode. In this mode the local operator can broadcast over one transceiver or over several transceivers simultaneously to several stations. Controls should be set as follows:

(1) The Mode Select switch is set to position 2 and the red indicator for that position should light.

(2) Select desired transceivers by setting appropriate SEIZE switches. Those transceivers will receive the audio from the microphone. At the same time, the B operator is locked out, that is, the B operator cannot seize those transceivers.

(3) Set the Mike Select switch to BOOM or HEADSET.

(4) The transceivers may be keyed in one of three ways in the Microphone Mode.

(a) Press push-to-talk button on Microphone Select block.

(b) Operate footswitch.

(c) Operate switch on Headset line.

When MODE SELECT switch is in the Microphone Mode, the send and receive traffic is recorded on the tape recorder right channel.

c. Tape Mode. In this mode tape recorder messages are routed to one or more Radio Sets for broadcast. Refer to subsection 2-15 regarding the preparations of messages for broadcast. Set controls as follows:

(1) Place Mode Select switch in tape mode (position 3).

(2) Select transceiver by operating SEIZE switches.

(3) Set Tape Channel Select switch to LEFT or RIGHT CH.

(4) Key transmitter manually by using PTT key on Microphone Select block, footswitch or switch on headset.

d. Remote Mode. In this mode, operator A received audio from operator B (operator A console may also be the source of audio for B operator). The audio from operator B is fed to operator A and routed to the Radio Sets under the control of operator A for rebroadcast. The B audio may be taped messages or taken from the telephone line. Set controls as follows:

(1) Set Mode Select switch on A operator console to REMOTE.

(2) Set appropriate transceiver SEIZE switches.

(3) Key transceiver(s) manually (on A Console, or B Console if B Console has REMOTE selected).

e. Radio/Radio. In this mode, the transceivers are configured so that the receive audio from Transceiver A becomes the transmit audio for Transceiver B and alternately the receive audio from Transceiver B becomes the transmit audio for Transceiver A. Set controls as follows:

(1) Set Mode Select to RAD/RAD (position 5).

(2) Set Transceiver Select switch to first Transceiver A position.

(3) Set Transceiver SEIZE switch to Transceiver B.

(4) Set ENABLE switch on Radio Relay Key block to ON position. The ENABLE switch activates the VOX circuits so that the receive audio from Transceiver A keys Transceiver B and vice versa. A special flip-flop design in the VOX circuit prevents the transceiver from keying at the same time.

(5) Transceiver A and Transceiver B may be keyed manually by the operator. In this case the ENABLE switch is placed in the OFF position. To key Transceiver A, hold momentary switch AUTO to MNL A position. Similarly, key Transceiver B by holding AUTO switch in MNL position.

f. Telephone/Radio. In this mode, a two-way telephone conversation may be routed through the Audio Keyline Panel to one or more transceivers. In this case the transceiver is keyed automatically by means of the RF-901A Phone Patch which is dedicated to the phone circuits.

(1) Set Mode Select switch on Voice Control block to TEL/RAD position 6.

(2) Set Transceiver SEIZE switches to SEIZE position.

(3) To place an outside call, the operator establishes contact with the called party and then puts the called party on HOLD. The operator presses the corresponding button on the upper row of the Telephone Select Panel.

g. Teletype Mode. The Teletype Mode has priority over the Voice Control Mode in that regardless of the voice mode selected, the voice circuits will be locked out when either RCVR SEL or XMTR SEL controls or the Teletype Control block are operated. The operator may choose the same transceiver for send and receive or may select the transmitter portion of one transceiver to provide duplex operation. Up to four TTYs may be accessed by the console operator. A TTY monitor switch allows the operator to monitor the FSK TTY signals or receive or transmit. To monitor the transmit side, the switch is held in the XMTR (up) position. To monitor the receive TTY audio, the switch is held in the RCVR (down) position.

2-11. TELEPHONE/INTERCOM OPERATION

a. To answer an incoming call, set controls to the following positions.

(1) Press illuminated button on lower group (operator-telephone line) of trunk select pushbuttons. An incoming call is indicated by a blinking light in the trunk select button and an intermittent tone emitted by the panel mounted SONALERT speaker device.

(2) Conduct conversation using operator handset.

b. To place an outgoing call, set controls to the following positions.

(1) Select trunk line on operator-telephone line pushbutton group.

(2) Enter number on keypad. Normally rotary dial pulses will be transmitted. If accessing a tone exchange, press ★ button on keypad. This bypasses the rotary dial converter and allows tones to go out on line.

c. To patch an incoming call to a transceiver, set controls as follows.

(1) Press trunk line button on operator-telephone line panel and answer caller.

(2) Place caller on hold by pressing HOLD button.

(3) Press corresponding button on Radio Telephone line panel to establish phone patch. Two-way audio is routed to the transceiver through the RF-901A.

(4) Set Mode Select switch on Audio/Keyline Switch Panel to TEL/RAD (position 6).

(5) When transmission ceases, press RLS button on Radio-Telephone Line.

d. For intercom operation, set controls as follows.

(1) Press ICOM button.

(2) Enter ICOM number as keypad.

(3) When called operator hears ICOM bell ringing that operator presses ICOM button and lifts handset off hook.

e. The operator may use the telephone handset to talk over one or more transceivers. Set controls as follows.

(1) Set Voice Control Selector switch to OFF ("0" position).

(2) Set Transceiver SEIZE switches.

(3) Press RADIO button on operator-telephone line panel.

(4) Conduct conversation using handset switch. This keys transceiver manually.

2-12. AUDIO MONITOR PANEL OPERATION

The three sections of the Audio Monitor Panel consist of A MONITOR, B MONITOR, and SEND/RECEIVE. Each section includes Squelch and Volume controls. Operate by adjusting controls to desired position.

2-13. RF-901 PHONE PATCH CONTROLS AND OPERATION

RF-901A Phone Patch is activated when the Voice Control Selector switch is set to TEL/RAD (position 6). Set controls to following positions.

a. Set Meter switch to +10.

b. Set OFF/MANUAL/VOX switch to VOX on RF-901A.

c. On Audio/Keyline Switch Panel, set Voice Control Selector switch to OFF "0" position.

d. Establish telephone contact with desired party.

e. While called party is speaking adjust TRANSMIT LEVEL CONTROL to provide a reading of "0" on the meter.

f. Adjust VOX Threshold Control until TRANSMITTER KEYED indicator remains on.

g. On Audio/Keyline Switch Panel, set Voice Control Selector switch to TEL/RAD (position 6).

h. Adjust RECEIVE level control to provide a reading of "0" on the meter.

i. RF-901A control may be adjusted periodically to provide the conditions outlined in the preceding steps one through six.

2-14. TAPE RECORDER OPERATION

The following procedures apply to the recording and playback of transceiver SEND/RECEIVE traffic, pre-recorded messages, and telephone conversations.

a. Recording Mode.

(1) Transceiver SEND/RECEIVE traffic (including phone patch operation).

(a) Set TAPE REC RT. CH. switch on Audio/Keyline Switch Panel to SND/RCV.

(b) Set Transceiver SEIZED switch to second position (SEIZE).

(c) On the Tape Control Panel, set Preselector REC-R to ON position.

(d) Set Tape Monitor switch to INPUT.

(e) Set Tape Speed control to 15/16.

(f) Press PLAY and REC buttons simultaneously.

(g) Adjust Input level control while monitoring right channel meter.

(2) Transceiver "A" MONITOR (Receive Only).

(a) Set TAPE REC RT. CH. switch on Audio/Keyline Switch Panel to A MONITOR.

(b) Set Transceiver SEIZED switch to third position (A MONITOR).

(c) On the Tape Control Panel, set Preselector REC-R to ON position.

(d) Set Tape Monitor switch to INPUT.

(e) Set Tape Speed control to 15/16.

(f) Press PLAY and REC buttons simultaneously.

(g) Adjust input level control while monitoring right channel meter.

(3) Transceiver "B" MONITOR (Receive Only).

(a) Set TAPE REC RT. CH. switch on Audio/Keyline Switch Panel to B MONITOR.

(b) Set Transceiver SEIZED switch to forth position (B MONITOR).

(c) On the Tape Control Panel, set Preselector REC-R to ON position.

(d) Set Monitor switch to INPUT.

(e) Set Tape Speed control to 15/16.

(f) Press PLAY and REC buttons simultaneously.

(g) Adjust input level control while monitoring right channel meter.

(4) Incoming Telephone Messages.

(a) Set Control Console controls for incoming telephone calls according to subsection 2-10 (a.).

(b) Set TAPE RECORD RT. CH. switch to TEL.

(c) On the Tape Control Panel, set Preselector REC-R to ON position.

(d) Set Tape Monitor switch to INPUT.

(e) Set Tape Speed control to 15/16.

(f) Press PLAY and REC buttons simultaneously.

(g) Adjust Input level control while monitoring right channel meter.

CAUTION

TAPE RECORD RT. CH. switch should be kept in SND/RCV position when not recording from A MONITOR, B MONITOR or TEL.

(5) Recording Messages

(a) Set Transceiver SEIZED switches to full up (OFF) position.

(b) Set TAPE RECORD RT. CH. switch to SND/RCV.

(c) Set Tape Monitor switch to INPUT.

(d) Set Mode Select switch to MIKE (position 2).

(e) On the Tape Control Panel, set Preselector REC-R to ON position.

(f) Set Tape Speed control to 15/16.

(g) Press PLAY and REC buttons simultaneously.

(h) Record message using either boom or headset microphone (select either boom or headset microphone on Microphone Select Panel).

(i) Adjust input level control while monitoring right channel meter.

b. Playback Mode.

(1) Operator Comment (Left Channel) Playback. The operator may listen to playback of the Operator Comment Channel (left). Set controls as follows:

(a) Press STOP on Tape Control Panel.

(b) Rewind tape to beginning of message.

(c) Set MONITOR switch to TAPE.

(d) Set Tape Playback Selector to either A MONITOR or B MONITOR speaker (operator may monitor audio on headset speaker) on Audio Monitor Panel.

(e) Set Tape Channel Selector switch to LEFT CH.

(f) Press PLAY button on Tape Control Panel.

(2) Right channel playback. The operator may listen to playback of the right channel. (SND/RCV). Set controls as follows:

(a) Press STOP on Tape Control Panel.

(b) Rewind tape to desired point on tape.

(c) Set MONITOR switch to TAPE.

(d) Set Tape Channel Selector switch to RIGHT CH.

(e) Set Tape Playback selector to either A MONITOR or B MONITOR speaker (operator may monitor audio on headset speaker) on Audio Monitor Panel.

(f) Press PLAY button on Tape Control Panel.

(3) Playback over Telephone Line. The operator may send a recorded message over the telephone. Set controls as follows:

(a) Press STOP on Tape Control Panel.

(b) Rewind tape to desired point or tape.

(c) Set MONITOR switch to TAPE.

(d) Set Tape Channel Selector switch to RIGHT CH.

(e) Establish telephone contact as described in subsection 2-12.

(f) Press PLAY button on Tape Control Panel.

(g) Monitor playback on telephone handset.

(4) Playback via radio. In this mode tape right channel information is routed to one or more transceivers for broadcast. Refer to paragraph 2-10 c. for control settings.

(5) Routing Recorded Messages to B operator.

(a) Press STOP on Tape Control Panel.

(b) Rewind tape to desired point.

(c) Set MONITOR switch to TAPE.

(d) Set Tape Channel Selector switch to RIGHT CH.

(e) Set Tape Playback Selector switch to REMOTE.

(f) Press PLAY button on Tape Control Panel.

(g) Monitor Level meters on Tape Control Panel for indication of playback.

2-15. CONTROL INTERFACE GROUP, OK-449(V)/FRC-176(V), OPERATING PROCEDURES

The following paragraphs outline normal operation of the Control Interface Group. The initial start-up procedures for all of the equipment in this system should be complete prior to operation. The Control Interface Group consists of the Telephone Equipment Bay and RF Equipment Bay.

a. Telephone Equipment Bay, Unit 1 Control Interface Group, OK-449(V)/FRC-176(V). The Telephone Equipment Bay contains patch panels for patching all signals and control lines for the system. The patch fields are dedicated to two and four wire telephone, tape player audio to and from the console, transmit key-lines, TTY audio and control, and transmit and receive audio. The patch panels are normal-through design and are used primarily for monitoring and troubleshooting. Patch cords are available for circuit configuration.

b. RF Equipment Bay, Unit 2 Control Interface Group, OK-449(V)/FRC-176(V). The RF Equipment Bay consists of RF Patch Panel and Antenna Control/Indicator for Log Periodic Antennas.

(1) RF Patch Panel. The RF Patch Panel allows any transceiver in the system to be connected to any antenna. In addition, a dummy load is available for connection to any transceiver.

(2) Antenna Control/Indicator, Operating Procedure. Set the ON/OFF switch to ON. The pilot lamp should light, indicating that dc voltage has been applied. If the pilot lamp does not light, check the LOCAL/REMOTE switch in the power assembly at the tower. Make sure it is in the remote position. To rotate the antenna, set the rotary control switch to the direction desired. After a time delay (approximately six seconds) the rotate light should come on, indicating that the antenna is rotating. When the antenna reaches the desired direction, the rotator will automatically stop, and the indicator light will go out, indicating that the desired direction has been attained.

(a) Local Operation.

CAUTION

Antenna control should not be switched between local and remote while the antenna is rotating. Due to the circuit parameters, severe arcing can occur in power relays, as well as motor overloads, etc.

To operate the rotator from the tower base, remove the cover from the tower power assembly and place the local/remote switch in the LOCAL position. This removes control from the remote station and places it at the local station. The operation of the time delay relay and relay circuits are the same as on the remote operation, with one exception. The rotator is now controlled by manually operating the CW/CCW switch. When switched back to the remote position, the rotator will seek its original azimuth.

2-16. NORMAL SHUTDOWN OF RADIO SET AN/URC-103(V)1

The Radio Set is turned off as follows.

a. Unkey the transmitter by releasing the console PTT switch, footswitch, or handset switch.

b. Set the PA STATUS control on the Remote Control-Monitor Unit, to STANDBY position. Wait approximately two minutes to permit the power tubes in the RF Amplifier to cool.

c. Set the PA STATUS control to the OFF position.

d. Turn OFF the POWER switches on the Preselector and Receiver-Transmitter.

e. Turn OFF the PRIMARY POWER switch on the RF Amplifier.

f. Turn OFF the external circuit breaker supplying 230 Vac power to the Radio Set.

Section III. EMERGENCY OPERATION

2-17. RADIO SET AN/URC-103(V) OPERATION

This section contains emergency operating procedures to allow the operator to continue operation of Radio Communications System if a portion of the system malfunctions. The following procedures are to be used in the event of a fault indication or a unit failure.

a. Fault Indications. Protective circuits in the RF Amplifier AM-7127/URC will activate the front panel OVERLOAD indicator if any of the following conditions occur:

- Excessive plate current in one or both of the final amplifier tubes
- Excessive RF voltages at the plates of the final amplifier tubes
- Loss of cooling air
- Open High-Voltage Interlocks in AM-7127/URC
- Excessive temperature in the Power Supply PP-5237/UR

The protective circuits are reset by momentarily placing the OVERLOAD switch in the RESET position. If the OVERLOAD indicator is activated again when the switch is released, more than a transitory overload condition exists. Notify maintenance personnel. If a fault occurs in the exciter or frequency synthesizer sections of the RT-1391(P), the FAULT indicator on the front panel of the Interface Unit CP-1479/URC will light. Notify maintenance personnel.

b. Processor-Interface Unit CP-1479/URC Failure. Normally, the RF Amplifier AM-7127/URC and Preselector F-1520/URC (optional) are automatically tuned by frequency data supplied from the Interface Unit CP-1479/URC. If a failure occurs in the frequency interface circuits of the CP-1479/URC, the AM-7127/URC and F-1520/URC can be manually tuned as follows:

- Rotate the FREQUENCY-MHZ control on the AM-7127/URC to the desired transmitter operating band.
- If the Preselector F-1520/URC is used, place the LOCAL/REMOTE switch in the LOCAL position. Select the desired receiver operating frequency using the front panel frequency controls.

c. RF Amplifier AM-7127/URC. If the RF Amplifier AM-7127/URC becomes inoperative, the receive and transmitter sections of the AN/URC-103(V)1 Radio Set can be operated as follows:

- For receiver operation, disconnect the antenna coaxial cable from connector J3 on the Radio Set and connect the cable directly to connector 17 (RCVR RF INPUT) on the Receiver/Transmitter RT-1391(P)/URC. Connect the antenna cable to connector J1 on the

Preselector. Full-rated receiver performance is still provided when the RF Amplifier is bypassed.

- For transmitter operation, connect the antenna coaxial cable directly to connector J1 (EXCITER RF OUTPUT) on the RT-1391(P)/URC Receiver/Transmitter. In this configuration, maximum transmitter RF output power will be between 100 and 300 milliwatts.

d. Preselector F-1520/URC Failure. If the Preselector F-1520/URC becomes inoperative, the receiver can be operated as follows:

- Disconnect the coaxial cable (W6) from connector J1 on the F-120/URC.
- Connect the free end of the coaxial cable directly to connector J7 (RCVR RF INPUT) on the RF-1391(P)/URC Receiver/Transmitter.

NOTE

Transmitter operation is not affected by the F-1520/URC.

e. Operator Emergency Actions (Radio Set). When a transceiver malfunction is encountered, perform the following checks:

- Refer to the appropriate procedures and carefully check to ensure that no vital steps have been omitted.
- Attempt to operate the Radio Set in a different mode.
- Check all front panel fuses. If any are open, the associated fuse indicator will light. Replace open fuses. If fuse opens again, refer problem to maintenance personnel.
- Ensure that all cable connections are properly connected and show no signs of damage.
- Ensure that operation has not been interrupted by an open interlock switch, dirty air filter, or an over-temperature condition.

If these checks do not correct the fault condition, notify maintenance personnel.

2-18. EMERGENCY SHUTDOWN

a. AN/URC-103(V). In the event of a catastrophic failure, such as an electrical fire, severe arcing, etc., shut off the Radio Set as follows:

- Place the PRIMARY POWER switch on the RF AM-7127/URC Amplifier to the OFF position.
- Turn OFF the circuit breaker providing 230 volt power to the Radio Set rack.

b. OJ-512/FRC-176(V). In the event of a catastrophic failure, or any condition requiring emergency shutdown of the Communication Control Console equipment group, remove power by selecting the OFF position at all circuit breakers supplying power to the system. These circuit breakers should be prominently labeled to facilitate this action.

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals and miscellaneous publications referenced in this manual.

A-2. FORMS

Accident Identification Card. . . . . DD Form 518

Equipment Daily or Monthly Log. . . . . DA Form 2408-1

Equipment Inspection and Maintenance Work Sheet . . . . . DA Form 2404

Maintenance Request . . . . . DA Form 2407

Discrepancy in Shipment Report . . . . . SF 361

Quality Deficiency Report . . . . . SF 368

Report of Discrepancy . . . . . SF 364

Operator's Permit . . . . . SF 46

Recommended Changes to Equipment Technical Publications . . . DA Form 2028-2

Maintenance Reporting (Air Force) . . . . . AFM Form 66-1

Technical Order System Publication Improvement Report and Reply . . . . . AFTO Form 22

A-3. TECHNICAL MANUALS

Maintenance Instructions, Organizational/Direct Support, Radio Communications System AN/FRC-176(V) . . . . . TM 11-5895-1137-23
T.O. 31R5-2FRC-176-2

System Parts Information, Radio Communications System AN/FRC-176(V) . . . . . TM 11-5895-1137-23P
T.O. 31R5-2FRC-176-4

Maintenance Instructions, Organizational/Direct Support/ General Support, Radio Set AN/URC-103(V)1 and Remote Control-Monitor C-11021/URC . . . . . TM 11-5820-893-14
T.O. 31R2-2URC-51

Parts Information, Radio Set AN/URC-103(V)1 and Remote Control-Monitor C-11021/URC . . . . . TM 11-5820-893-24P
T.O. 31R2-2URC-54

READEX FICHE best copy available

Maintenance Instructions, Communication Control Console OJ-512/FRC-176(V) and Control Interface Group OK-449(V)/FRC-176(V)	TM 11-5805-734-14 T.O. 31R5-2FRC-176-11
Parts Information, Communication Control Console OJ-512/FRC-176(V) and Control Interface Group OK-449(V)/FRC-176(V)	TM 11-5805-734-24P T.O. 31R5-2FRC-176-14
Maintenance Instructions, Organizational/Direct Support/ General Support, Antenna AS-3513/GRC, Antenna AS-3514/GRC, Antenna AS-3915/GRC, Antenna AS-3529/GRC, Antenna AS-3530/GRC, Antenna AS-3531/GRC, Antenna AS-3532/GRC, Electrical Dummy Load DA-712/GRC.	TM 11-5985-363-14+P T.O. 31R2-2GRC-1251
Destruction of Army Electronics Materiel	TM 750-244-2
The Army Maintenance Management System (TAMMS)	TM 38-750
Unsatisfactory Equipment Reporting (Air Force)	TO-00-35D54
Report of Discrepancy.	AR 735-11-2 DLAR 4140.55 NAVSUPINST 4440.127E AFR 440.54 MCO 4430.E
Discrepancy in Shipment Reporting.	AR 55-38 DLAR 4500.15 NAVSUPINST 4610.33B AFR 75-18 MCO P4610.19C
Equipment Improvement Report	AFM 900-4
Index of Technical Publications, Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins and Lubrication orders (Army)	DA Pam 310-4

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

B-1. SCOPE

This appendix lists components of end item and basic issue items for Radio Communications System AN/FRC-176(V) to help you inventory items required for safe and efficient operation.

B-2. GENERAL

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the equipment in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, the BII must be with the AN/FRC-176(V) during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number. If item needed differs for different models of this equipment, the model is shown under the "Usable On" heading in this column. These codes are identified as:

Code	Used On
PAA	Model XXX
PAB	Model XXXX
PAC	Model XXXX

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g. ea, in, pr).

e. Column (5) - Quantity Required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM

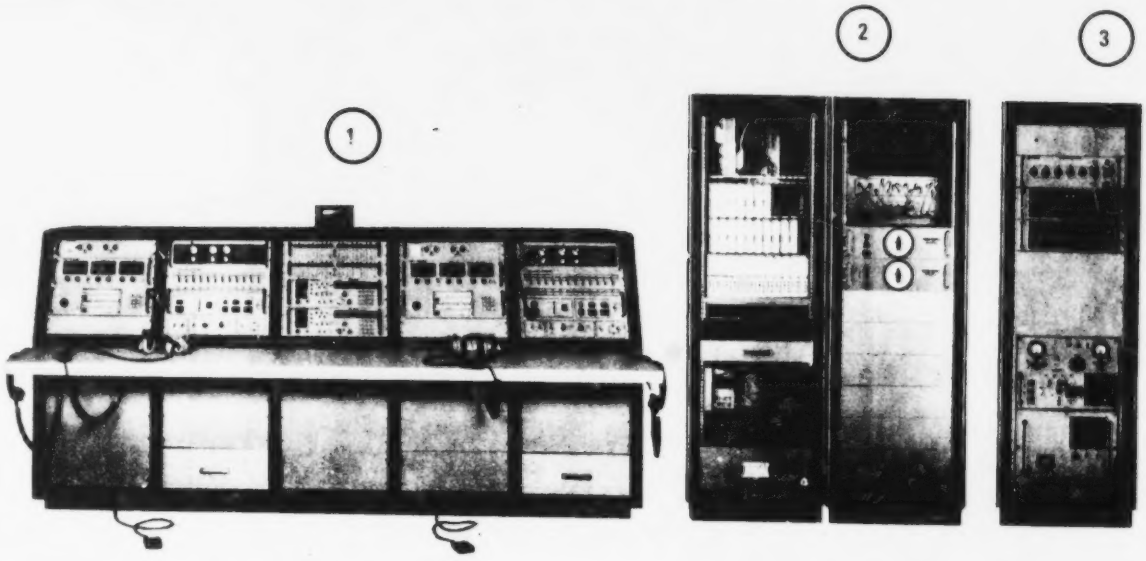


Figure B-1. Radio Communications System AN/FRC-176(V)

Table B-1. Components of Radio Communications System AN/FRC-176(V)

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		COMMUNICATION CONTROL CONSOLE OJ-512/FRC-176(V) (14304) (7052-1000)		EA	*
2		CONTROL INTERFACE GROUP OK-449(V)/FRC-176(V) (14304) (7052-2000)		EA	1
3		RADIO SET AN/URC-103(V)1 (14304) (10061-3050)		EA	*

*Quantities vary with site requirements as follows:

	Bann	Boeblingen	Edingen	Bremerhaven	Nellingen	Incirlik
AN/URC-103(V)	22	8	6	6	6	10
OJ-512/FRC-176(V)	3	1	1	1	1	1

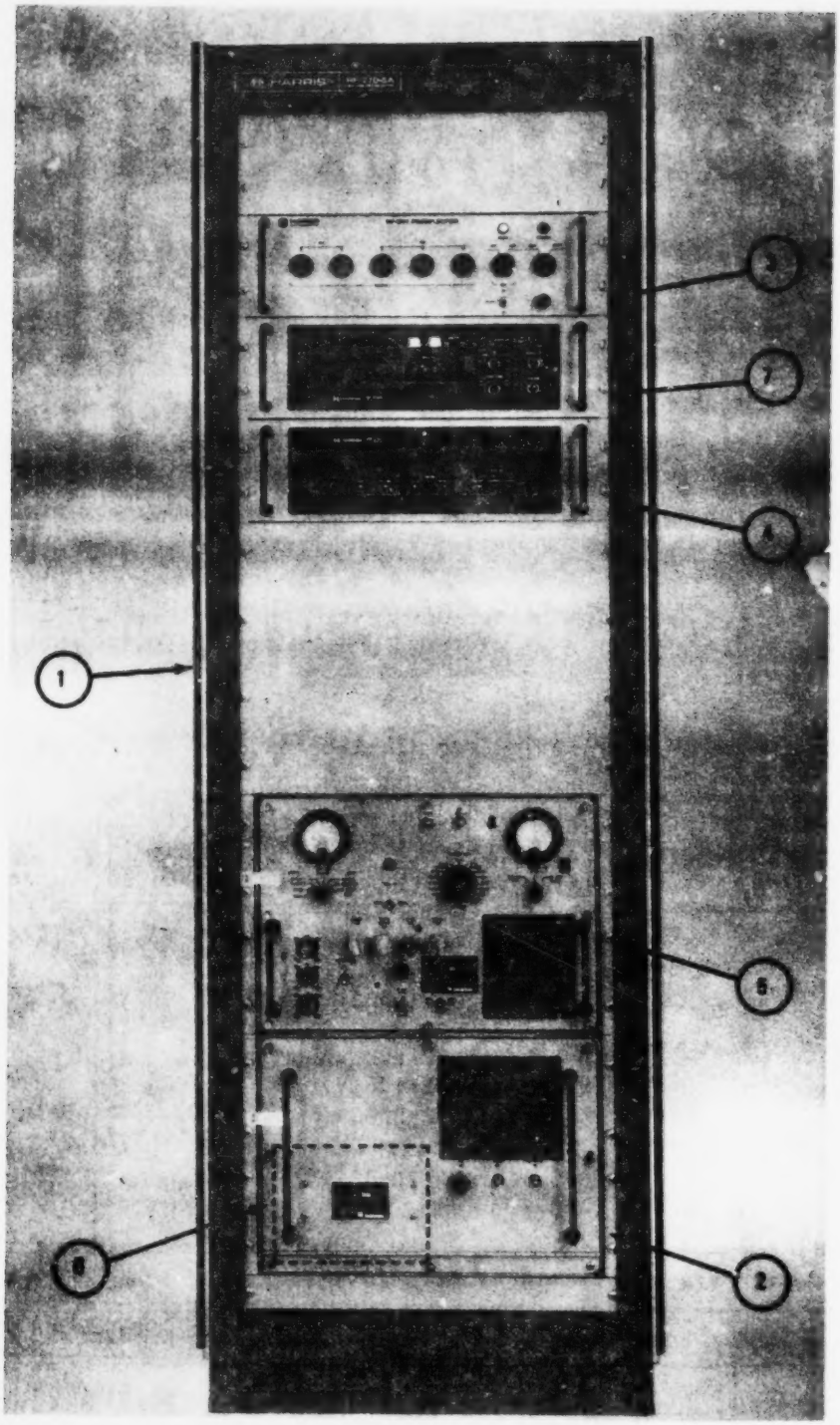


Figure B-2. Radio Set AN/URC-103(V)1

Table B-2. Components of Radio Set AN/URC-103(V)1

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number Usable On Code	(4) U/M	(5) Qty rqr
1		ELECTRICAL EQUIPMENT RACK MT-6199/URC (14304) (10061-3110)	EA	1
2		POWER SUPPLY PP-5237/UR (14304) (10061-3050)	EA	1
3		PRESELECTOR F-1530/URC (14304) (0905-4050)	EA	1
4		PROCESSOR-INTERFACE UNIT CP-1479/URC (14304) (10061-2006)	EA	1
5		RADIO FREQUENCY AMPLIFIER AM-7127/URC (14304) (1932-1000)	EA	1
6		RADIO FREQUENCY SWITCHING UNIT SA-2347/URC (14304) (10061-0200)	EA	1
7		RADIO RECEIVER-TRANS-MITTER RT-1391(P)/URC (14304) (10061-1150)	EA	1

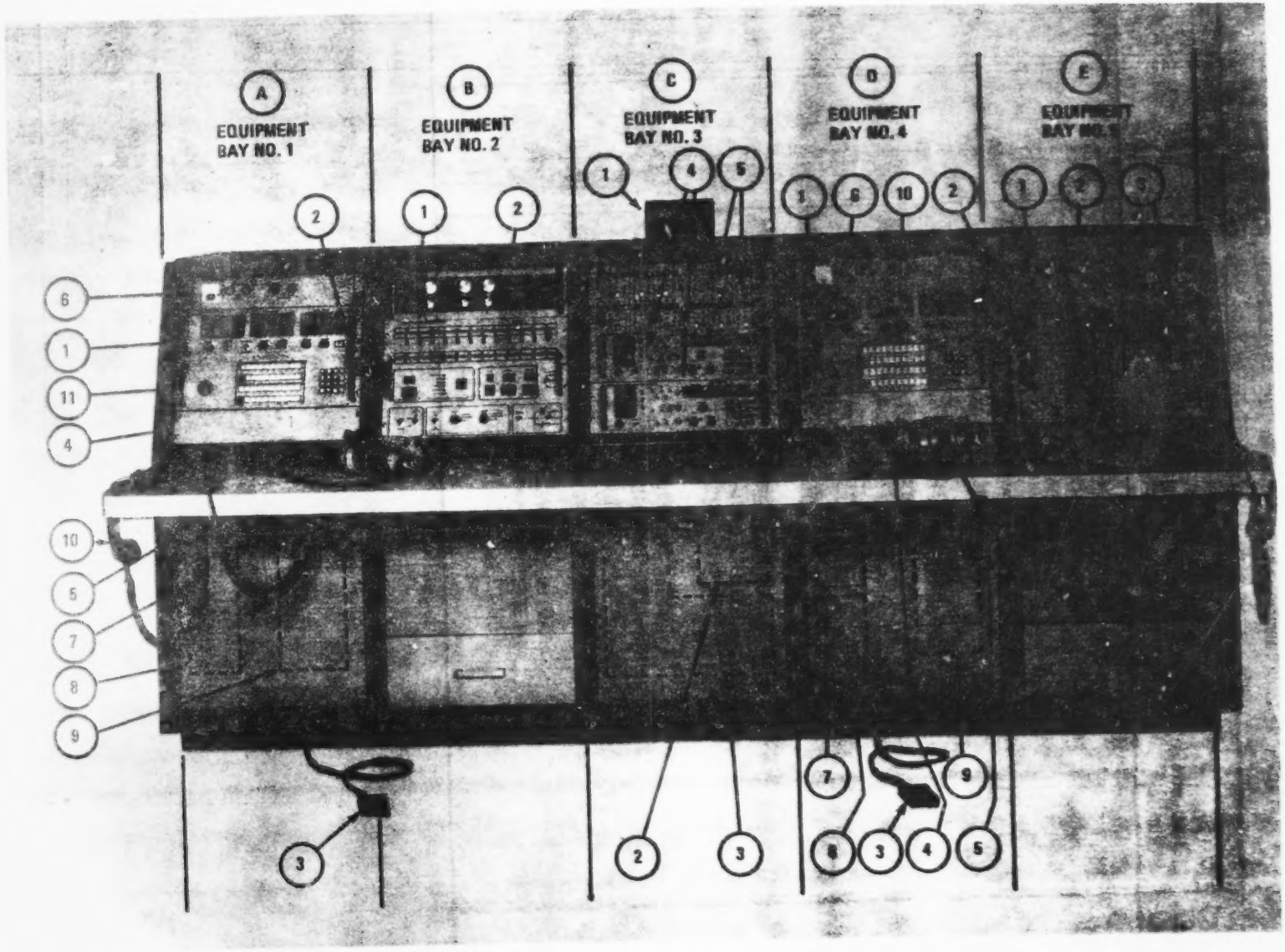


Figure B-3. Communication Control Console OJ-512/FRC-176(V)

Table B-3. Components of Communication Control Console OJ-512/FRC-176(V)

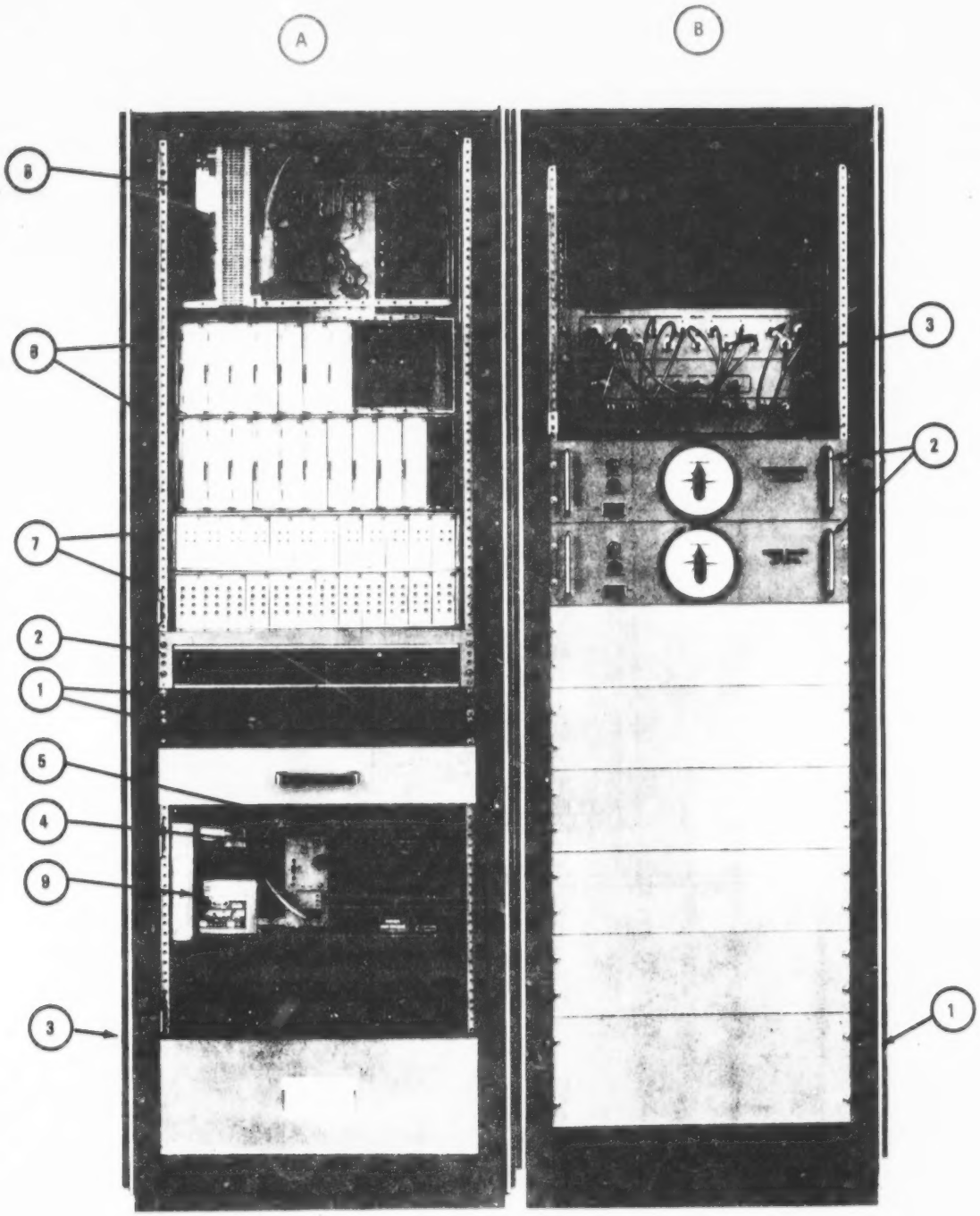
(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
A		EQUIPMENT BAY NO. 1 (14304) (7052-1500)		EA	1
1		AUDIO MONITOR ASSEMBLY (14304) (7052-1100)		EA	1
2		BOOM MICROPHONE (54715) (Model 562)		EA	1
3		FOOTSWITCH (14304) (RF-920)		EA	1
4		HEADSET (14304) (7052-3009)		EA	1
5		HEADSET/LAMP TEST PANEL (14304) (7052-1120)		EA	1
6		PHONE PATCH PANEL (14304) (RF-901A)		EA	1
7		POWER SUPPLY (-24 VDC) (14749) (B24GT210-230)		EA	1
8		POWER SUPPLY (+12 VDC) (14749) (B12GT650-230)		EA	1
9		TAPE TRANSPORT UNIT (14304) (7052-1252)		EA	1
10		TELEPHONE HANDSET (14304) (7052-1310)		EA	1
11		TELEPHONE SWITCH/ DIAL PANEL (14304) (7052-0020)		EA	1
B		EQUIPMENT BAY NO. 2 (14304) (7052-1600)		EA	1
1		AUDIO KEYLINE SWITCH PANEL (14304) (7052-1200)		EA	1

Table B-3. Components of Communication Control Console OJ-512/FRC-176(V) (Continued)

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number Usable On Code	(4) U/M	(5) Qty rqr
2		TAPE CONTROL UNIT (14304) (7052-1251)	EA	1
C		EQUIPMENT BAY NO. 3 (14304) (7052-1610)	EA	1
1		DIGITAL CLOCK ASSEMBLY (14304) (7052-1730)	EA	1
2		MITEL QUADVERTER (36665) (CF1070)	EA	1
3		RACK CONNECTOR/ SWITCH PANEL (14304) (7052-1710)	EA	1
4		REMOTE CONTROL-MONITOR UNIT C-11021/URC (14304) (10063-0000)	EA	2
5		STATUS MONITOR PANEL (14304) (10063-5100)	EA	1
D		EQUIPMENT BAY NO. 4 (14304) (7052-1800)	EA	1
1		AUDIO MONITOR ASSEMBLY (14304) (7052-1100)	EA	1
2		BOOM MICROPHONE (54715) (Model 562)	EA	1
3		FOOTSWITCH (14304) (RF-920)	EA	1
4		HEADSET (14304) (7052-3009)	EA	1
5		HEADSET/LAMP TEST PANEL (14304) (7052-1120)	EA	1
6		PHONE PATCH PANEL (14304) (RF-901A)	EA	1

Table B-3. Components of Communication Control Console OJ-512/FRC-176(V) (Continued)

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number On Code	(4) U/M	(5) Qty rqr
7		POWER SUPPLY (-24 VDC) (14749) (B24GT210-230)	EA	1
8		POWER SUPPLY (+12 VDC) (14749) (B12GT650-230)	EA	1
9		TAPE TRANSPORT UNIT (14304) (7052-1252)	EA	1
10		TELEPHONE SWITCH/ DIAL PANEL (14304) (7052-0020)	EA	1
E		EQUIPMENT BAY NO. 5 (14304) (7052-1900)	EA	1
1		AUDIO KEYLINE SWITCH PANEL (14304) (7052-1200)	EA	1
2		TAPE CONTROL UNIT (14304) (7052-1251)	EA	1
3		TELEPHONE RECEIVER (14304) (7052-1310)	EA	1



UNIT 1 TELEPHONE EQUIPMENT BAY

UNIT 2 RF PATCH EQUIPMENT BAY

Figure B-4. Control Interface Group OK-449(V)/FRC-176(V)

Table B-4. Components of Control Interface Group OK-449(V)/FRC-176(V)

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
A		TELEPHONE EQUIPMENT BAY (SEE FIGURE B-4) (14304) (7052-2020)		EA	1
1		AUDIO PATCH PANEL ASSEMBLY (70674) (JC-2-48/M)		EA	2
2		DC PATCH PANEL ASSEMBLY (14304) (7052-5100)		EA	1
3		ELECTRICAL EQUIPMENT RACK (14304) (7052-2020)		EA	1
4		POWER SUPPLY (48 VDC REG.) (25426) (8401-00)		EA	1
5		POWER SUPPLY (24412) SB6613B-002)		EA	1
6		TELEPHONE CARD SHELF (25426) (400-11)		EA	2
7		TELEPHONE CARD SHELF (25426) (811-00)		EA	2
8		TELEPHONE PUNCH BLOCK (27412) (S66A12-5W)		EA	1
9		TRANSFORMER (48207) (35-1020)		EA	1
B		RF PATCH EQUIPMENT BAY (SEE FIGURE B-4) (14304) (7052-2010)		EA	1
1		ELECTRICAL EQUIPMENT RACK (14304) (7052-2010)		EA	1

Table B-4. Components of Control Interface Group OK-449(V)/FRC-176(V) (Continued)

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number / Usable On Code	(4) U/M	(5) Qty rqr
2		LP ANTENNA REMOTE CONTROL/INDICATOR (15536) (873492)	EA	⚠1
3		RF PATCH PANEL (14304) (7052-XXXX - SEE NOTE ⚠2)	EA	1
		NOTES:		
		⚠1 BREMERHAVEN SITE: 1 UNIT BOEBLINGEN SITE: 2 UNITS ENDINGEN SITE: 2 UNITS NELLINGEN SITE: 2 UNITS INCIRLIK SITE: 3 UNITS BANN SITE: 4 UNITS		
		⚠2 BANN SITE: PART NO. 7052-2300 BOEBLINGEN SITE: PART NO. 7052-2100 BREMERAHVEN SITE: PART NO. 7052-2400 ENDINGEN SITE: PART NO. 7052-2200 INCIRLIK SITE: PART NO. 7052-2300 NELLINGEN SITE: PART NO. 7052-2100		

Section III. BASIC ISSUE ITEMS

TM 11-5895-1137-10
TO 31R5-2FRC-176-1

DEPARTMENT OF THE ARMY TECHNICAL MANUAL
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

SYSTEM OPERATOR'S MANUAL
FOR
RADIO COMMUNICATIONS SYSTEM
AN/FRC-176(V)

TM 11-5895-1137-23
TO 31R5-2FRC-176-2

DEPARTMENT OF THE ARMY TECHNICAL MANUAL
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

MAINTENANCE INSTRUCTIONS
ORGANIZATIONAL/DIRECT SUPPORT
RADIO COMMUNICATIONS SYSTEM
AN/FRC-176(V)

Table B-5. Radio Communications System AN/FRC-176(V)
Basic Issue Items List

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		SYSTEM OPERATOR'S MANUAL, RADIO COMMUNICATIONS SYSTEM AN/FRC-176(V) TM 11-5895-1137-10 T.O. 31R5-2FRC-176-1 (14304) (10061-XXXX)		EA	1
2		TECHNICAL MANUAL, MAINTENANCE INSTRUCTIONS, ORGANIZATIONAL/DIRECT SUPPORT, RADIO COMMUNICATIONS SYSTEM AN/FRC-176(V), TM 11-5895-1137-23 T.O. 31R5-2FRC-176-2 (14304) (10061-XXXX)		EA	1

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By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

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